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Natural Resources of
OKLAHOMA

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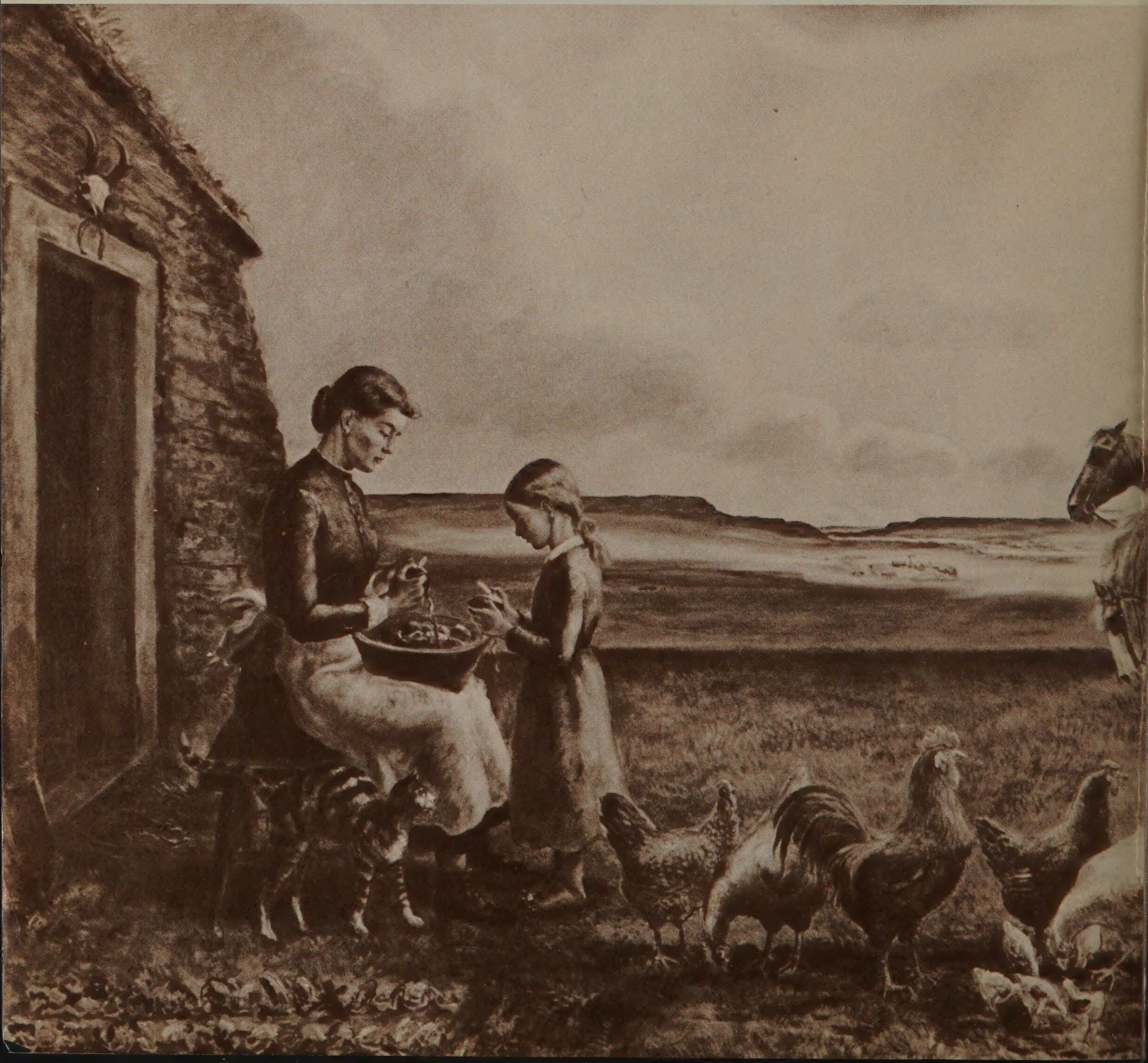
The purpose of this booklet is to bring a new awareness on the part of the American people of our rich natural resource heritage, its history, its present, and its future. To know our land is to love it and cherish it and protect it from the ravages of both nature and man

Walter J Hickel

Secretary of the Interior.

Each member of the family was expected to contribute a full day's work in order to make settlement successful.



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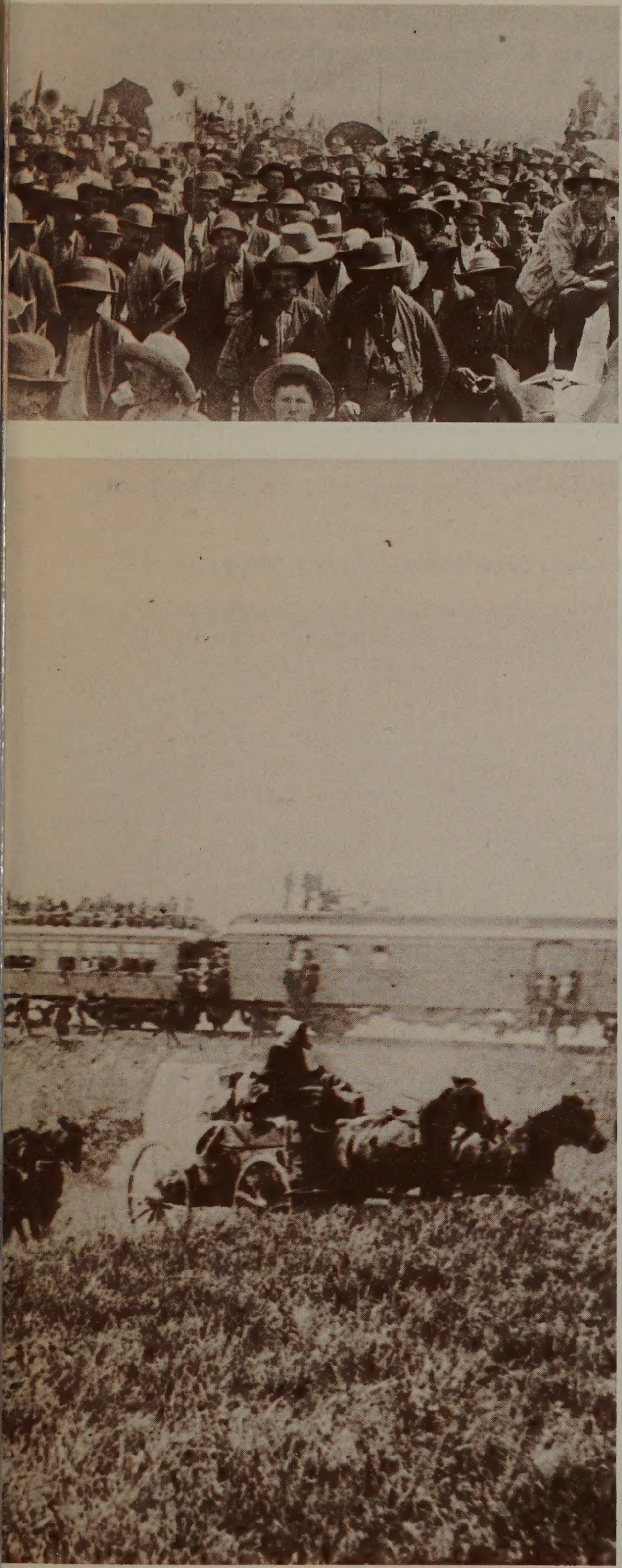
GREAT SEAL OF THE STATE OF OKLAHOMA

1907



The Sooner State

Indian Territory, Sooners, Boomers, oil wells—all are words important in understanding Oklahoma's past and, therefore, her future. One of the last States to join the Union, the history of the Sooner State provides fascinating reading.

Coronado is the first European known to have seen Oklahoma. In 1541, he passed through in search of gold. He was followed by other Spanish explorers who reported that the area was populated by a few bands of poor Indians and that "crooked-back cow" (buffalo) grazed the prairies.

In 1682, La Salle claimed all the lands drained by the Mississippi for the King of France. Due to various agreements, this land, the Louisiana Province, reverted to Spain in 1762 and then, in 1800, was regained by France. Through the Louisiana Purchase, the area was bought in 1803, and thus, except for the Panhandle counties the future State of Oklahoma was obtained by the United States.

Oklahoma was sparsely populated by a few Osages, small bands of Indians of Caddoan stock, and some nomadic Comanches and Kiowas. During the 1830's, President Jackson pressured the Five Civilized Tribes (Cherokees, Creeks, Chickasaws, Choctaws, and Seminoles) to leave their lands in the southeastern section of the country and to migrate to what is now called Oklahoma. Thus began the "Trail of Tears."

Trail of Tears

The Five Civilized Tribes had lived in close contact with the white population for more than a century. They had established schools and churches; some owned great plantations, though most lived in simple cabins.

The success of the land run of 1889 prompted other runs. Men and women in all walks of life came to stake claims. Lawyers, ministers, teachers, merchants, and doctors saw the new towns as ready markets for their services.

Their trip across the country to their new land was hard. Sickness and death accompanied their journey. However, they had been granted perpetual tenure on their new land, and the Indians felt that this meant they could stay "as long as grass shall grow and waters run."

Each tribe was a separate nation, making and enforcing its own laws. Sophisticated forms of government were set up with parliamentary assemblies run by competent legislators.

The Indians began to prosper. They cleared land, built schools and churches, and entered into friendly relations with other tribes.

With the outbreak of the Civil War, it was natural that these people who had come from the South and some of whom owned slaves, sympathize with the Confederacy. During 1861, the Five Civilized Tribes made alliances with the Confederacy, however strong Union factions were evident among the Cherokees, Creeks, and Seminoles. These tribes were torn by miniature civil wars.

Though no nationally important battle was fought in the Indian Territory, guerrilla bands ravaged the countryside. People fled from their homes—Union sympathizers to Kansas and Confederate sympathizers to the Red River region. While they were gone, thieves looted and burned barns and homes, selling livestock to army contractors.

After the war, the Federal Government contended that the Five Civilized Tribes had, by their "rebellion," forfeited their lands and treaty guarantees. It was proposed that the land be opened to white settlement. The Indians protested strongly, and the United States agreed to take only the western half of their lands and use it as a home for other Indian tribes.

Indians from Kansas and other States were removed and settled on the ceded land. The "wild" Plains tribes went through the form of accepting reservations, though they continued to hunt in Texas, Colorado, and Kansas until there no longer were buffalo herds.

In 1870, leaders of the Five Civilized Tribes met at Okmulgee, the Creek capital, in order to form a confederated Indian Territory to be administered by Indians. Other meetings were held which the Plains Indians attended. But before the aim could be accomplished, the Federal Government stopped the meetings.

Settlement Pressure

With rapid population growth on northern, southern, and eastern borders, keeping the territory exclusively Indian became increasingly difficult. Between 1870 and 1872, when the first railroad was built across the territory, a number of white men entered the land. Some came as employees or tenants of the Indians, but some were intruders who defied the tribal governments and existing Federal laws.

These people were outside the authority of the Indians. They were without civil law, and

in criminal matters, they were under the jurisdiction of the Federal court at Fort Smith, Ark. Their children did not have access to tribal schools, and their homes were built on lands to which they could not obtain title. Naturally they were eager to have a government created in which they would have a voice.

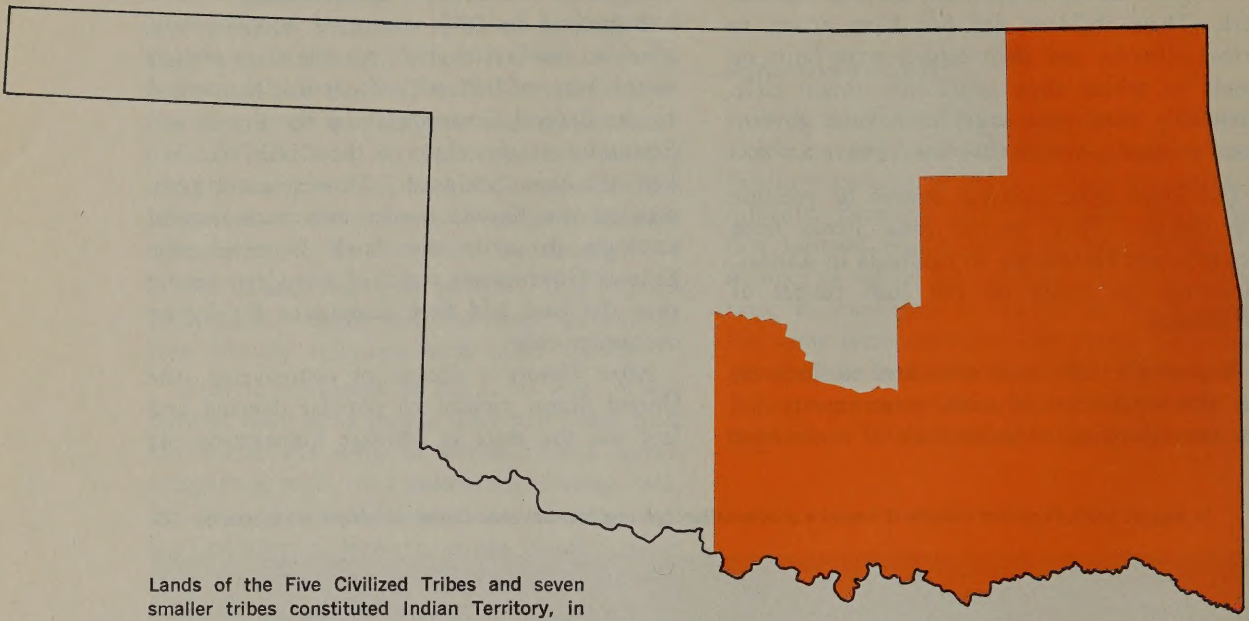
Cattlemen were another source of pressure for change. They moved their herds from Texas across Oklahoma to railroads in Kansas, fattening the herds on the lush ranges of Oklahoma.

Repeatedly, bills were submitted to Congress for the liquidation of tribal governments and for the allotment to individuals of reservation lands held in common, with "surplus" land being made available for homesteading.

Beginning in 1879, extensive publicity was given to the fact that a desirable tract of land in the heart of Indian Territory had been ceded to the Federal Government by the Creeks and Seminoles at the close of the Civil War and had not been "assigned." Homesteaders gathered at the Kansas border and made several attempts to settle this land. However, the Federal Government removed intruders, saying that the land had been designated for Indian occupancy only.

After almost a decade of controversy, the United States yielded to popular demand and laid out the tract in 160-acre homesteads. At

In August 1893, President Cleveland issued a proclamation opening the Cherokee Outlet to settlers on September 16.



Lands of the Five Civilized Tribes and seven smaller tribes constituted Indian Territory, in orange. Oklahoma Territory, in white, contained 23 counties and the Kaw, Osage, Wichita, Caddo, Kiowa, Comanche, Apache, Oto-Missouri, and Ponca reservations.

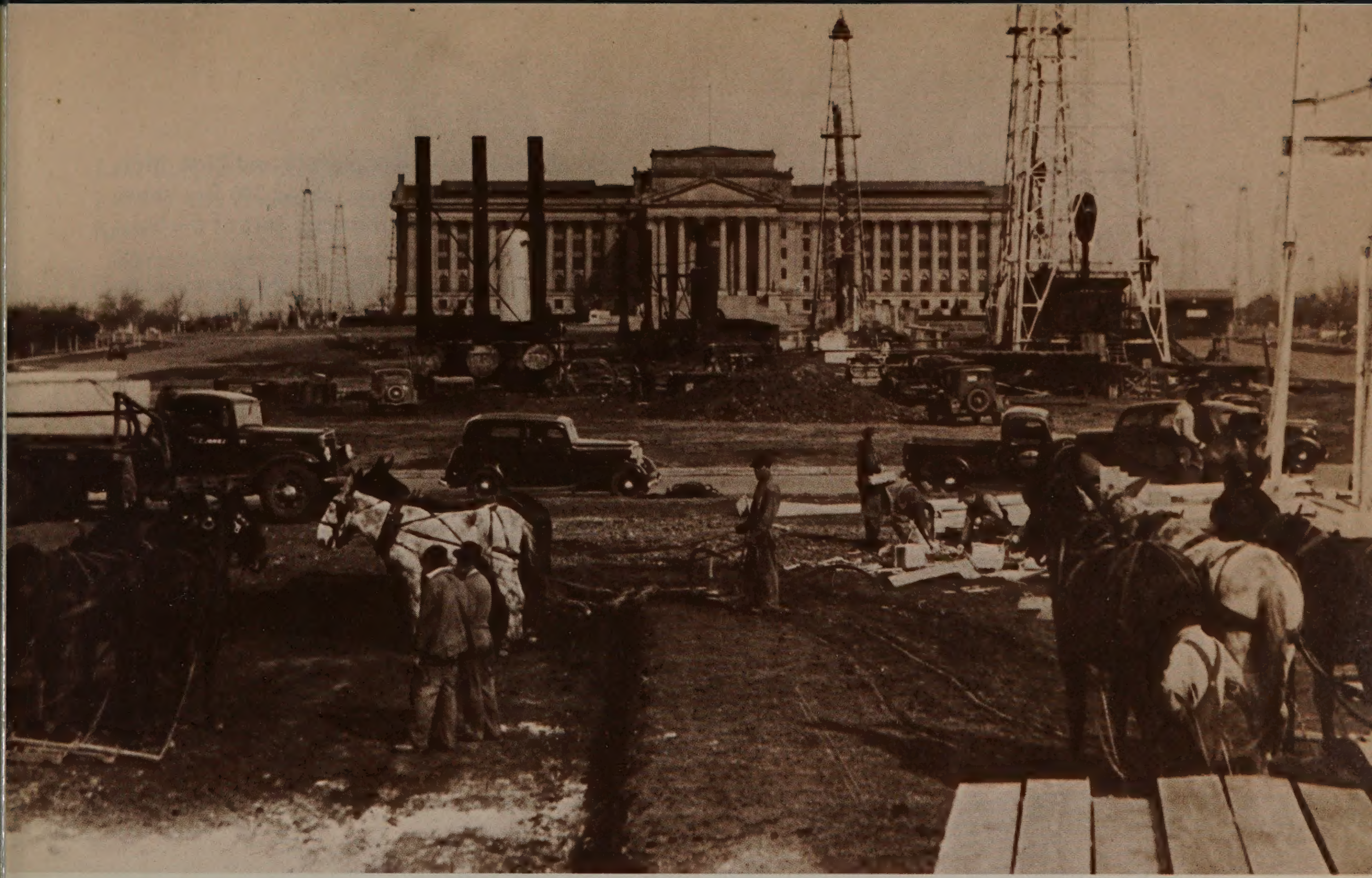
noon on April 22, 1889, it was to be opened for white settlement. Some people, known as Sooners, sneaked onto the land before the official opening. However, thousands of Boomers, who had campaigned for the opening of these lands, waited for the bugles to sound and guns to fire signaling the legal opening. Men raced on horseback, on foot, by train, and in covered wagons, to stake their claims to desirable plots. Taking possession was the first goal. Lots were marked temporarily with stakes and string. Tents were put up. Oklahoma City and Guthrie, which had been railroad sidings on April 21, became cities of 10,000 and 12,000 overnight. During the weeks following the "run," stores were opened, newspapers begun, and offices established.

"Twin Territories"

In May 1890, Congress established Oklahoma Territory with Guthrie as capital; what is today Oklahoma consisted of "Twin Territories"—the Indian Territory and the Oklahoma Territory. Oklahoma Territory grew rapidly in population and area. As Indian tribes accepted reservations, their surplus lands were opened to white settlers and "runs" were held.

In 1893, Congress created the Dawes Commission and authorized it to negotiate with the Five Civilized Tribes for termination of their existence as nations. Tribal governments were liquidated and the estates divided among the citizens. Townsites were set aside, town governments organized, bonds voted, new school systems organized, and waterworks and electric plants established. Federal officials divided "extra" land equally among the tribal citizens or sold it at auction for their benefit.

In 1905, leaders of the Five Civilized Tribes, with a few white sympathizers, called a meeting to write a constitution to govern all inhabitants of Indian Territory. They wished to form a new State named "Sequoyah," in honor of the man who invented the Cherokee syllabary. The constitution was submitted to the people, both Indian and white, and overwhelmingly adopted. But it was never accepted by Congress.



Even the grounds of the State capitol were not exempt from oil well drilling during the 1930's.

The people of Oklahoma Territory were also anxious to attain statehood. Under the Enabling Act passed by Congress in 1906, delegates from both the Indian Territory and Oklahoma Territory met at Guthrie to draw up a constitution. On November 16, 1907, Oklahoma was admitted to the Union.

Just before achieving statehood, the first great oilfields were discovered, an event that drastically changed the economic outlook of the new State. In 1910, the capital was moved from Guthrie to Oklahoma City. With earnings from oil wells drilled on the grounds of the capitol, a million-dollar State office building was erected in the mid-1930's.

Looking Forward

The development of human resources through education has been a concern of Oklahomans since the arrival of the Five Civilized Tribes. Today, 99.7 percent of the teachers in elementary and high schools have bachelor degrees and more than 40 percent have their masters or a more advanced degree. Since education is considered a lifelong process, the University of Oklahoma has devoted a new building complex to adult education.

Alongside the development of human resources has been the growth of many industries concerned with the development of Oklahoma's natural resources, particularly oil. Drilling rigs and other equipment necessary to the recovery of oil are manufactured, and there are a number of oil refineries in Oklahoma. Meat packing and fruit and vegetable canning plants also are located here.

In addition, a new diversity is developing. The aircraft, tire, and phone equipment industries, to name a few, have been introduced.

This growth offers a challenge to the citizens of Oklahoma since growth makes conservation a more immediate need. Today, the citizens of Oklahoma are being challenged to demonstrate that conservation of natural resources can be accomplished while both industry and population grow and change.

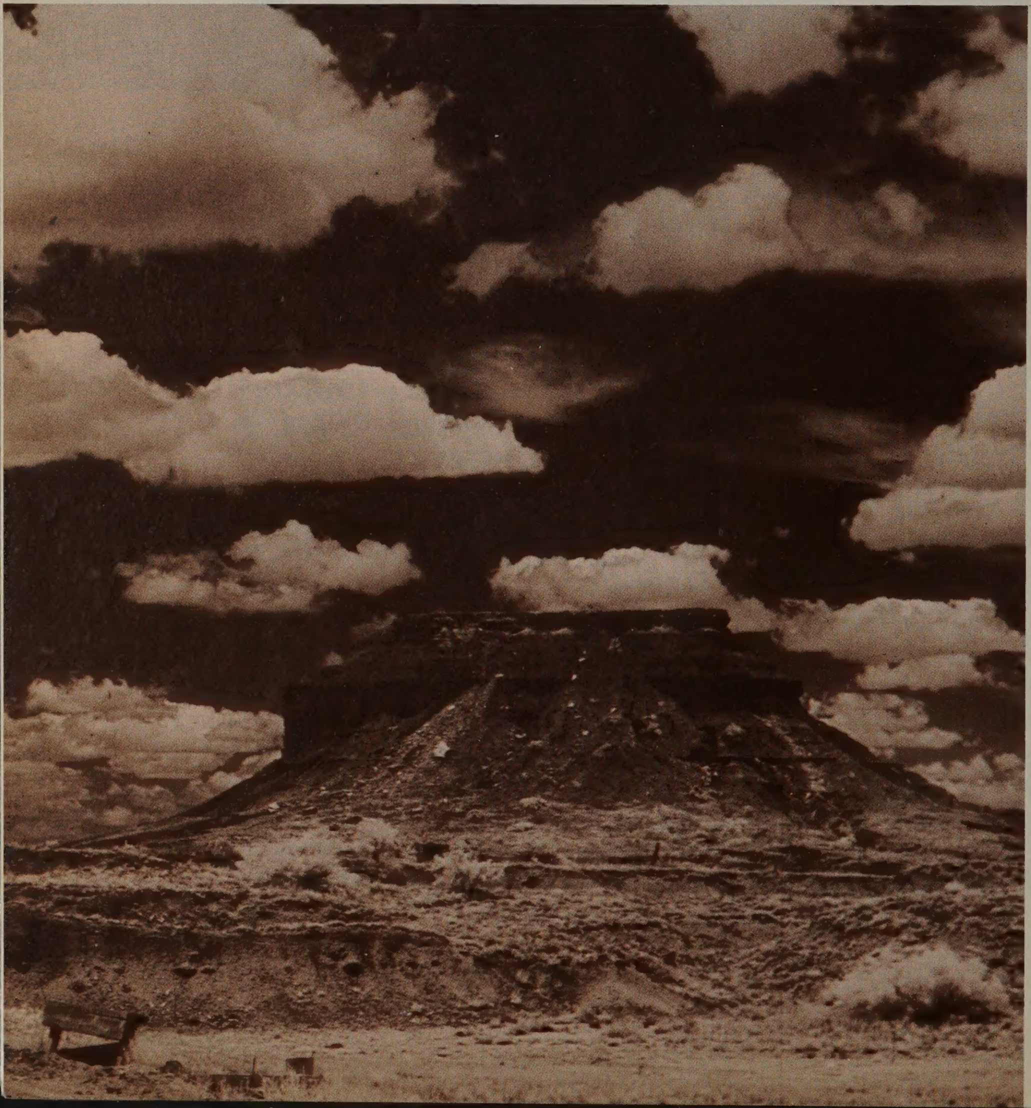
Physical Characteristics

Oklahoma, which is 18th in size among the States, encompasses about 70,000 square miles in an area that resembles, in outline, a saucepan. The Panhandle, consisting of three adjoining counties in the northwestern part of the State, extends westward more than 170 miles. Oklahoma is bounded on the north by Kansas and Colorado, on the east by Missouri and Arkansas, on the south and west by Texas, with the western end of the Panhandle bounded by New Mexico.

The highest elevation in the State, Black Mesa, is a lava-capped mesa about 5,000 feet above sea level. It is located in the Panhandle near the borders with Colorado and New Mexico. The lowest elevation, about 290 feet above sea level, is in the southeastern part of the State on the Little River.

The southeastward slope of the Sooner State is reflected in the pattern of eastward flowing streams. The main rivers are the Arkansas and Red. The Arkansas enters the north-central part of Oklahoma and flows diagonally southeastward, leaving the State at about midpoint on its eastern border. The Red River forms part of the southern boundary with Texas. All major streams empty into one of these two rivers and both rivers empty into the Mississippi. Chief among the other streams are the Cimarron, North Canadian, Canadian, Washita, Grand (Neosho), and Verdigris Rivers.

Although there are no large natural lakes in Oklahoma, there are major artificial reservoirs, such as Lake Texoma on the Red River,



Lake Eufaula on the Canadian River, and Grand Lake O' the Cherokees on the Grand (Neosho) River.

There are four mountain regions—the Ozark, Ouachita, Arbuckle, and Wichita Mountains. Interestingly enough, Black Mesa, the highest point in the State is not located in any of these mountain areas.

The Ozarks, an area of gentle hills and deep valleys in the northeastern part of the State, are the western portion of the Ozarks of Missouri and Arkansas. The Oklahoma Ozarks are between 1,400 and 1,500 feet above sea level.

The Ouachita Mountains (pronounced washitaw) in the southeast contain mostly sandstone and shale beds that have been folded and faulted into a series of eastward-trending ridges and valleys. Some areas are almost 3,000 feet above sea level.

The Arbuckle Mountains in south-central Oklahoma are a group of hills less than 1,000 feet above surrounding areas. These hills are all that remain of an older and much higher mountain range that has been lowered by erosion.

The Wichita Mountains in southwestern Oklahoma are ancient mountain peaks that were once buried but are now being uncovered. Composed of granite and other basement rocks, these peaks formed a group of islands in an ancient sea. Wave action cut flat surfaces on the submerged rocks near the shore and horizontal grooves in low cliffs at the shorelines. After this cutting by wave action, the peaks were covered by sand and muds that today

(Left) The Glass Mountains contain gypsum and mica which shine in the sun. (Center) Much of the State is plains area. (Right) Oklahoma has four mountain regions.

make up the enclosing Red Bed Plains. Mt. Scott, the highest point in the Wichita Mountains, is 2,464 feet above sea level.

Plains areas make up the rest of the State. The Arkansas River and its tributaries have weathered the Prairie Plains which surround the Ozark Mountain area and have caused considerable relief to develop, especially in the area between the Ozarks and Ouachitas.

To the west of the Prairie Plains are the Sandstone Hills, a belt of outcropping sandstone beds that form an escarpment extending northward into Kansas.

West of the Sandstone Hills are the Red Bed Plains. These plains extend across the State from north to south and completely surround the Wichita Mountains. Gypsum beds which retard erosion form cap rock for some of the hills referred to as "gyp hills." These hills are most prominent in the western part of Oklahoma.

The northwestern counties, including the three counties of the Panhandle, are west of the red beds area and are in the High Plains region. This region is grassland, with tree growth generally restricted to stream valleys.

South of the Arbuckle and Ouachita Mountains, the Gulf Coastal Plain slopes gently toward the Gulf of Mexico.

Geologic History

The oldest rocks known in Oklahoma, the so-called basement rocks, are granites exposed in the eastern part of the Arbuckle Mountains and in the northeastern part of the State near Spavinaw. Both granites are more than 600 million years old; the granite from the Arbuckles has been dated by radioactive dating methods and is about 1.1 billion years old. Younger basement-type rocks, between 600 million and 525 million years old, are present in the Wichita Mountain area and are presumed to overlie the old granites. While these basement rocks were exposed at the surface, they underwent weathering and probably hills and valleys developed before they were buried.

During the Paleozoic Era (525 million to 225 million years ago), Oklahoma was repeatedly covered by seas and, each time, sediments were deposited in these seas that became the limestones, sandstones, and shales we see today. Uplifting occurred after each period of submergence, and while the areas were above sea level, previously formed rocks were exposed and eroded.

In the later part of the Paleozoic, the Carboniferous Period (350 million to 270 million years ago), all the geologic structures prominent in the State today were formed. These included the four previously discussed mountain areas and the Nemaha Ridge, a buried ridge that extends from south of Oklahoma City northward into Kansas. Apparently, some volcanoes erupted during the period of mountain building because beds of volcanic ash are present in the Ouachita Mountains. The volcanoes were probably located south of the present Ouachitas.

Downwarped areas adjoining these uplifts developed. The deepest of these areas were the Anadarko Basin north of the Wichita Mountains and the Arkoma Basin north of the Ouachita Mountains. Sand and mud, eroded from the uplifts, were deposited in these basin areas and in other areas that were below sea level. During the Permian Period, the last 45 million years of the Paleozoic, the red beds which make up the Red Bed Plains were deposited in the seas, probably covered the Wichita Mountains, and may have covered the Arbuckles as well.

Rocks of the Mesozoic Era (225 million to 70 million years ago) cover some of the western parts of the State as well as the southeastern part. Rocks of early and middle Mesozoic age (Triassic and Jurassic Periods) present in the Panhandle are being uncovered by the downcutting Cimarron River. They consist mostly of sediments from wind action or sediments found in streams and lakes. Rocks of the latest Mesozoic age (Cretaceous Period) were deposited in seas that reinvaded the area 70 million to 135 million years ago. These rocks form scattered buttes in western Oklahoma and underlie the Gulf Coastal Plain in the southeastern part of the State.

Between 70 million and 11 million years ago, erosion was the dominant geologic process, but in western Oklahoma, this stopped during the Pliocene Epoch (11 million to 3 million years

Erosion has produced these fantastic rock formations found in Black Mesa State Park.

ago) when stream deposits were laid down. These deposits contain the remains of camels, sabre-toothed cats, and horses that lived during that time. More recently, when glaciers covered the northern part of the continent (the Pleistocene Epoch), streams flowing from the Rocky Mountains brought in sand and gravel which were deposited along the stream valleys. Though glaciers never reached Oklahoma, sediments and fossils in the streams and gravels indicate that the climate was cooler and wetter than now. After the last glacial retreat, the erosion process that was interrupted during the Pliocene Epoch resumed and currently is continuing.

Climate

"If you don't like Oklahoma's weather, wait a minute" was the advice of Will Rogers. Indeed, weather changes are pronounced from season to season and often from day to day. Summers are long and hot; winters are shorter and less rigorous than those of the more northern Plains States. Snow rarely remains on the ground more than a few days.

The mean annual temperature ranges from 64° F. in the extreme southern counties along the Red River to near 60° F. in the northernmost counties. It decreases westward across the Panhandle to near 56° F. in Cimarron County.

Summer temperatures often reach or exceed 100° F. However, low humidity and moderate southerly breezes lessen the discomforting effects of the extreme heat. Nights are generally pleasant because the clear skies and dry air allow rapid cooling after sunset.

Oklahoma is one of six States that lies astride the 100th meridian—historically regarded as the dividing line between the humid East and the semiarid West; the distribution of rainfall decreases sharply from east to west across the State. Average annual rainfall ranges from over 50 inches in the southeast (in northern McCurtain County) to 15 inches in extreme western Cimarron County in the Panhandle.

Rainfall is heaviest in late spring and early summer. Late summer and early fall rainfall is usually less abundant and more localized. Moisture from warm Gulf air masses is the principal source of rain. In the fall and spring particularly, these air masses come in contact with southward pushing cold, dry arctic air masses, the so-called blue northers. When these air masses meet, atmospheric instability and precipitation frequently result. Thunderstorms are common and sometimes are accompanied by tornadoes.

The average length of the growing season ranges from 170 days in Cimarron County to 222 days in southern McCurtain County.

Indian Heritage

Oklahoma is sometimes called the melting pot of the American Indian. At least 68 Indian tribes have been associated in some way with the State's history and, today, more Indian tribes retain their tribal identity and characteristics in Oklahoma than in any of the other so-called Indian States. In the 1960 census, the Indian population of about 65,000 ranked second only to that of Arizona, which had over 83,000.

Once only the nomadic Plains tribes roamed and hunted in the western part of what is now Oklahoma. The Osages of Kansas and Missouri, the Wichitas, and a few other small bands visited the northeastern section from time to time. But other Indian peoples migrated to Oklahoma because of the policies and pressures of white men.

Migration to Oklahoma

The first step in establishing permanent Indian settlements within the present State boundaries was taken in 1802 when French traders persuaded a large band of Osages to move from Missouri to northeastern Oklahoma.

When the Louisiana Purchase in 1803 added new lands to the growing Nation, the western part of the purchase became popularly known as Indian Territory. President Jefferson and others believed this remote part of the country would be a place where Indians could live in freedom, out of the path of advancing white settlement.

In March of 1804, Congress authorized the President to negotiate with Eastern tribes to cede their land to the United States in exchange

This Kickapoo Indian house was photographed in 1875.

for new tribal lands in the Indian Territory. Through treaties with the indigenous Osages and Quapaws in the early 1800's, the Government secured lands in the territory for resettlement.

First to agree to removal were the Northeastern woodland Indians, many of whom had already been pushed from coastal areas to the Great Lakes region. By 1809, the Delaware, Piankashaw, Wea, Sac, Fox, Potawatomi, and Kaskaskia tribes had ceded lands in the area that now includes Wisconsin, Illinois, and Indiana and moved south and west toward Indian Territory.

Under the administration of President Andrew Jackson, the Indian Removal Act of 1830 established procedures for voluntary exchange of eastern Indian lands for new western acreage that was to be held by the tribes under perpetual guaranty from the Government.

Largest of the groups to move into Oklahoma were the Five Civilized Tribes which were resettled between 1828 and 1846, moving from their lands in the Southeastern United States. About 60,000 in all, this group of Cherokees, Chickasaws, Choctaws, Creeks, and Seminoles had reached a high degree of cultural development. Long at peace with white men, they had established schools, courts to administer tribal laws, and governments based upon the Federal pattern. They were farmers, storekeepers, and millwrights, as well as prosperous estate owners.

Although removed to the new lands under treaties, the Indians resisted resettlement and suffered severely as the Government forced their migration. Even those who went willingly faced hunger, illness, and cold as the result of inadequate preparation by the Federal agents assigned to guide them.

All of the Indian Territory that lay within the present State boundaries of Oklahoma was assigned to the Five Civilized Tribes, with the exception of the northeastern corner. This was occupied by a mixed group of Senecas, Shawnees, Quapaws, and various Eastern tribes.

The northern part of the Territory was assigned to the Cherokees, the central part to the Creeks, and the southern part to the Choctaws. The Chickasaws later purchased the right of settlement among the Choctaws, and the Seminoles moved from Florida to live among the Creeks.

The Indians reestablished their tribal institutions, and soon each tribe had organized as a separate nation under the United States protection. There were five tribal capitals where Indian legislators met in parliamentary assembly.

Civil War to Statehood

When the Civil War broke out, most members of the Five Civilized Tribes clung to their Southern tradition and sided with the Confederacy, but there were Oklahoma Indians fighting valiantly on both sides. General Stand Watie, a Cherokee brigadier general, commanded a Confederate brigade and was the last Confederate general to lay down his arms, surrendering on June 23, 1865.

After the war, the Five Civilized Tribes lost the western part of their area as punishment for their part in the Confederate war effort. The Federal Government began assigning the land to displaced and landless Indians from Kansas and other States.

The post-Civil War period was marked by general unrest among Indians throughout the West who protested mistreatment by white settlers and encroachments on their lands. Federal troops were sent to protect settlers and put down Indian uprisings.

One of the many disastrous encounters between Government forces and Indians occurred at the Washita River in western Oklahoma in November 1868, when Chief Black Kettle and his band were the victims of an unprovoked attack by Federal troops.

By the late 1800's trading posts established by the Government to carry on trade with the Indians were rapidly growing into commercial settlements. In time, the tribes were persuaded to cede lands adjacent to these settlements to the Government under treaty terms. More lands were later ceded to provide rights-of-way for public highways to connect trading communities. Because of the building of the transcontinental railroad and advancing white settlement, the Government also demanded new treaties to gain railroad rights-of-way across Indian lands.

With passage of the General Allotment Act of 1887, the breaking up of the Indian reservations began. This act provided for Indian lands to pass from tribal ownership to individual Indian owners. Of the original 30 million acres allotted to individual Indians, little more than 1.4 million acres remains in Indian hands.

With the opening of the "unassigned lands" in 1889, the white population grew rapidly; in 1890, the Territory of Oklahoma was formed. When Oklahoma became a State in 1907, a new era began.

Oklahoma Indians Today

Today, Oklahoma's Indians are justly proud of their heritage. Every July, residents at Anadarko relive a page or two of their colorful history at the annual American Indian Exposition. Directed by Indians of southwestern Oklahoma, the exposition features entertainment based on Indian history, traditions, customs, and ceremonies. Indian arts and crafts are exhibited, as well as agricultural and industrial products. For 6 days, Indians and non-Indians from every corner of the country, joined by visitors from other lands, recapture some of the flavor of life in Indian America.

In the 1920's, there was a revival of interest in Indian art that was led by a group of Kiowa artists from Oklahoma. Many gifted Indians continue to stimulate interest in traditional Indian art forms and to develop new and experimental methods of expression.

A number of prominent Americans claim kinship with Oklahoma Indian tribes. A former Vice President of the United States, Charles Curtis, was the descendant of Osage and Kaw Chiefs, and other Oklahoma tribes now are represented among Government leaders.

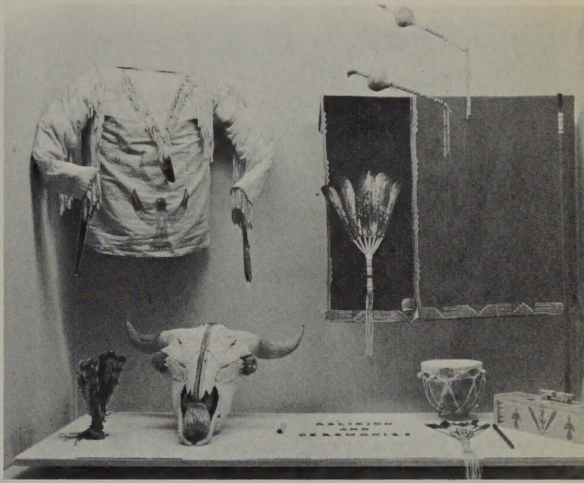
Will Rogers, Sr. and Jr., came from Cherokee stock. The Osage sisters, Maria and Marjorie Tallchief, have delighted ballet audiences in this country and abroad with their dance artistry. The noted musician and composer, Louis Ballard, is a Quapaw.

The sports prowess of the Oklahoma Indians has been displayed by such personalities as Jim Thorpe, renowned football star of the Sac and Fox; Frank Medina, Cherokee athletic trainer and Olympic coach, and Allie Reynolds, Creek major league baseball player.

Oklahoma has also produced her share of Indian military leaders and winners of the Congressional Medal of Honor. An Osage Indian, Gen. Clarence L. Tinker, was commanding general of the United States Air Forces in Hawaii in 1942 when he died in action while leading his bomber command against the enemy.

In these and other fields of endeavor—business, education, law—Oklahoma Indians are making their mark on American life.

The Southern Plains Indian Museum and Crafts Center, Anadarko, Okla., is operated by the Indian Arts and Crafts Board, an agency of the U.S. Department of the Interior. Exhibits create a better understanding of the history and culture of Southern Plains tribes.



Land and Forests

Prior to World War I, most of the Oklahoma Panhandle was a grazing area which supported a heavy sod of luxuriant grass. However, with the outbreak of war, high prices and patriotic appeals for more wheat started a "plow-up" which was accelerated by the advent of farm tractors. Cultivation and destruction of native sod together with periodic droughts and high winds brought spectacular dust storms during the 1930's; the Oklahoma Panhandle—along with the Texas Panhandle, western Kansas, eastern Colorado, and northeastern New Mexico—was in the heart of the area plagued.

The drought, a major causative factor in the creation of the "dust bowl," began in the summer of 1931 and continued into 1938. A preview of what was ahead came on April 14, 1934, when the first big "black roller" made its way across the Panhandle. The dust storm literally "blacked out" the sun in midafternoon. From May 10 to 12, 1934, other dust storms came out of the West, crossed the Panhandle, and carried dust eastward to darken the sun over the Nation's Capitol and drop dust on ships in the North Atlantic.

Land in the dust bowl was damaged by re-

moval of topsoil or by deposit of windblown material that smothered crops and grass, formed hummocks or dunes, buried fences, and choked highways and railroads. More than 200 major storms were recorded. With crop failures common, many farmers financially unable to continue the fight abandoned their once-productive fields. In the Panhandle counties—Cimarron, Texas, and Beaver—more than 240,000 acres were abandoned. This abandoned acreage was a constant menace to other farmers battling to stabilize their fields against the ravages of the high winds.

In September 1935, the Department of Agriculture's Soil Conservation Service set up a demonstration project at Guymon to help farmers combat drought through soil and moisture conservation practices. Though many farmers declined to adopt these methods, many who did were able to increase their yields in spite of rainfall deficiency. In 1937, Texas and Beaver Counties increased their wheat yields to 450,000 bushels; while far short of a bumper crop, it was 100,000 bushels more than in 1936.

The "dirty thirties" were succeeded by a wet cycle in the forties. New settlers came to the area, some to occupy farms abandoned in the

Cattle and calves account for about 45 percent of the total agricultural income of the Sooner State.

thirties. During World War II, farmers again expanded their acreage to meet food demands. Bumper crops were the rule and prices were high. Then drought struck again in the 1950's. Old-timers viewed the prospects of another dust bowl with alarm. Although conservation work following the storms of the thirties had proved very effective, the region was once more called the dust bowl.

In 1956, Congress passed the Great Plains Conservation Program giving farmers technical and financial help in initiating conservation programs to repair their land and protect it from future droughts and winds. Areas subject to high winds in the 10 Great Plains States were eligible. A major aim was to shift land unsuited for cropland into grass and other uses.

By the end of the 1960's, the dust bowl area of Oklahoma had a new face. Land in Texas and Beaver Counties no longer was subject to damage by winds. Today, it is estimated that in the 30 western counties of the State subject to blowing, only about 50,000 acres still face problems if and when another drought and high winds hit the plains.

Agriculture Today

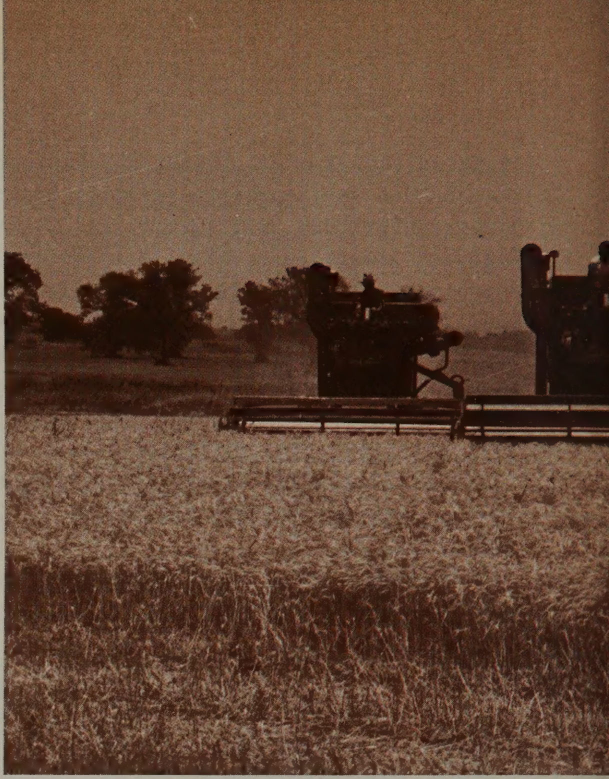
Of the 44,087,680 acres of land in Oklahoma, 36,077,472 acres or approximately 82 percent is farmland. About 36 percent of the farmland is cropland and 62 percent is pasture and woodland.

Cattle and calves account for about 45 percent of Oklahoma's total agricultural income. Here, in the "Heart of Cow Country," cattle and calves are more numerous than ever before with more than 4½ million counted in 1966. Almost 200,000 of these were dairy cows 2 years old and older.

Hogs, sheep, chicken, and turkeys are also important to Oklahoma's economy.

Wheat, cotton, peanuts, peaches, broomcorn are some of the crops which are grown in Oklahoma where soil types, length of growing season, and amount of rainfall vary from section to section.

The State ranks third among the States as a wheat producer. Wheat is not only the biggest cash grain crop, but it is also valuable as winter pasture for cattle, sheep, and dairy stock. The "bread basket" areas are the north-central, southwest, and Panhandle counties.

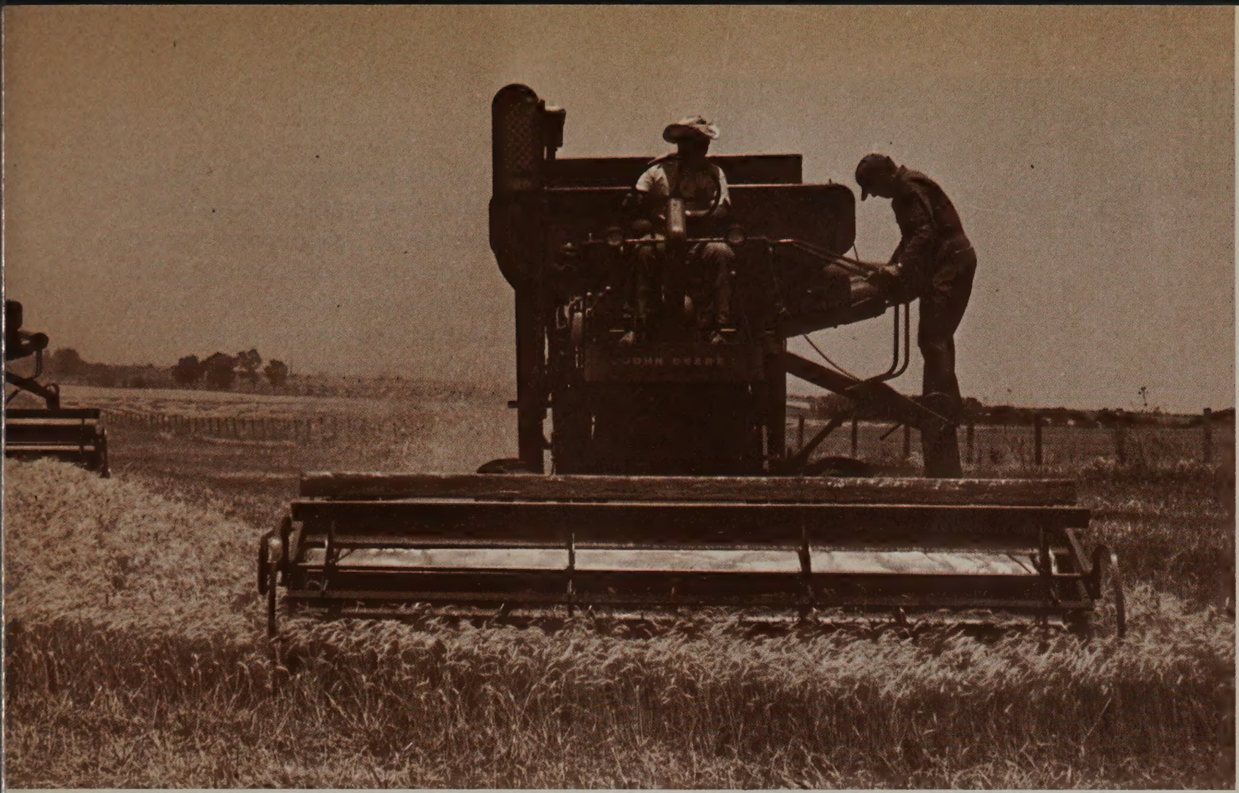


Grain sorghums, the prairie farmers' corn, are used for feed and forage. They are better adapted than wheat to sandy soils. Varieties of grain sorghums that can be harvested by combine have become a major crop replacing wheat when growing hazards indicate a wheat crop failure or when acreage control allotments limit the amount of land that can be planted to wheat. Grain sorghums supplement the vast amounts of forage produced on Oklahoma's rangelands and the fodder makes good winter roughage and silage material.

Peanuts can be grown on sandy lands in Oklahoma. They are produced as a cash crop in areas where rainfall is about 30 inches or greater, or where irrigation water is available.

Cotton formerly was produced in all eastern Oklahoma counties and in western ones south of the Canadian River, but production has decreased greatly in the past 30 years, partly due to soil depletion and partly due to the realization that other crops could be grown more profitably.

Peaches, plums, apples, and strawberries are



In late spring and early summer, thousands of combines roll across fertile wheatlands harvesting bumper crops.

grown mostly in the east as are truck crops such as green beans, spinach, melons, and sweet corn.

Broomcorn is grown near Boise City, Arnett, Cheyenne, Chickasha, and Lindsay. Pecan orchards flourish from Waurika to Tulsa.

Forest Resources

Oklahoma's forests may be divided into five main types: oak-hickory, elm-ash-cottonwood, oak-gum-cypress, loblolly-shortleaf pine, and oak-pine.

The State's commercially valuable forests are concentrated in the 17 eastern counties of the State with about 56 percent of this area forested. Hardwood species constitute more than half of the growing stock and over 40 percent of the sawtimber.

Timber products cut in a recent year totaled 30 million cubic feet. More than half of the volume was pine, with McCurtain, Pushmataha, and Le Flore the major producers. These counties produced virtually all of the pine timber harvested and about 40 percent of the hardwood.

Saw logs constitute more than half of the timber harvest with over three-quarters of the saw logs pine and the remainder primarily oak. Seven large sawmills cut 80 percent of the logs, but more than 100 smaller sawmills also are in operation.

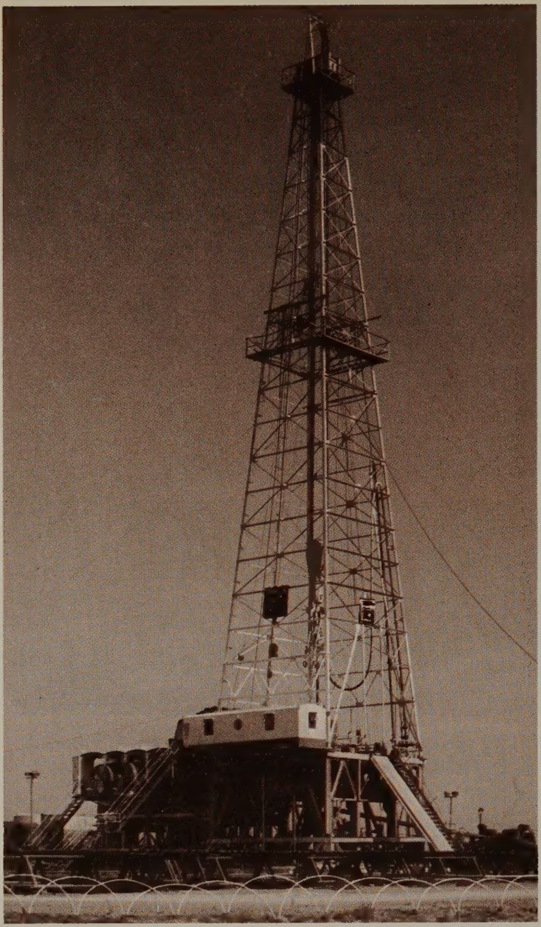
Fuelwood (usually hardwoods) is the second largest timber use. But as urbanization increases, the demand for fuelwood is diminishing.

Though the market for pine posts is still lively, the use of hardwoods for posts is decreasing.

The output of pulpwood has gained rapidly in recent years, and more growth is foreseen as new mills are built in nearby Arkansas.

Other wood products include logs, bolts for charcoal, furniture stock, handle stock, veneer, cooperage, and miscellaneous items.

The value of forests cannot be measured by the output of forest products alone. Trees along the banks of rivers and streams and on the slopes of mountains and hills protect water supplies. Shelterbelts shield crops, soil, cattle, and farmsteads from the ravages of the wind and provide food and cover for wildlife. Forests provide recreation areas, and perhaps most important, their cultivation and protection indicates a growing concern for stewardship of our land.



Mineral Resources

With petroleum production in Oklahoma at its highest level in almost 30 years, fossil fuels remain the State's dominant mineral product, accounting for over 94 percent of a mineral output estimated at close to a billion dollars annually.

Although the dollar value of petroleum and related products—including the rare gas helium—exerts the primary influence on Oklahoma's mineral economy, oil is by no means the only mineral asset of the Sooner State. Other minerals produced in varying amounts, but of economic significance, are: lead, zinc, copper, silver, bituminous coal, stone, clay, sand and gravel, gypsum, tripoli, salt, and volcanic ash. Cement and lime are also important commodities derived from mineral raw materials.

Collectively, Oklahoma's mineral industries provide wages totaling nearly $300 million annually for thousands of workers in the State.

The first discovery of crude petroleum in Oklahoma was recorded in 1889 near present-day Chelsea. Several years later, production began in the State's first important oilfield, the Red Fork, and since then, crude oil and its derivative products have represented a steadily increasing percentage of Oklahoma's mineral industry income.

Ranking fourth among the States in production, Oklahoma contributes approximately 230 million barrels of crude petroleum annually to the national economy. Overproduction during the late 1920's depressed prices; consequently, the rate of production has been rigidly controlled since 1931. Today, a daily quota based on a depth-acreage formula regulates output. This kind of regulation was recently liberalized to bring supply more closely in line with demand.

Approximately 80,000 wells now produce oil in Oklahoma, and about 4,000 new wells are drilled annually. Not all of these, however, will be producers. For example, out of 4,006 wells completed in a recent year, 464 produced gas, 2,256 produced oil, and 1,286 were dry. Conservation policies, stemming from the 1931 regulations and exemplified by the present depth-acreage-formula limit, are doing much to assure that Oklahoma's estimated 1½-billion barrel crude oil reserve will be fully utilized with maximum benefit to the Nation.

More than a dozen refineries in the State have a collective production capacity exceeding 417,000 barrels of crude oil daily. In addition to fuels and lubricants, these refineries supply asphalt for roofing and road building and raw materials for making petrochemicals, petroleum coke, and wax.

Producing nearly $200 million worth of natural gas a year from roughly 7,000 wells, Oklahoma ranks third among the States that supply this versatile fuel. Natural gas liquids, such as natural gasoline and liquefied petroleum (LP) gases, bring in an additional $73 million annually.

The bituminous coal-mining industry, based on a coal reserve estimated at 3 billion tons, annually contributes approximately $4.3 million to Oklahoma's mineral fuels account. The State's output, now totaling about 850,000 tons annually, is expected to grow as new markets continue to develop. Oklahoma coals generally are satisfactory for use in making metallurgical coke, and, with the recent construction of 50 coke ovens in the State, increased production appears assured.

Although dwarfed by the magnitude of the fuels industry, other mineral resources have also been important to Oklahoma. Extensive zinc and lead deposits of the Tri-State District, where the corners of Oklahoma, Kansas, and Missouri touch, have been mined since Civil War days. Though mining, milling, and smelting activities in the district have a history of expanding or contracting in response to demand for their products, centralized milling of the output of several mines is a fairly constant activity in the Oklahoma section. The State's annual production of about 3,000 tons of lead is worth nearly $900,000; zinc output, averaging between 12,000 and 13,000 tons a year, is valued at nearly $4 million.

Until recently, little emphasis had been placed on finding and developing deposits of other minerals, but now, a copper deposit in the southwestern part of the State near Creta has been opened.

Silver, a metal in short supply today, is a valuable coproduct of the copper operation and continues to be a byproduct of zinc-lead smelting. Germanium, a raw material for transistors and other items, is also a byproduct of the zinc-lead industry.

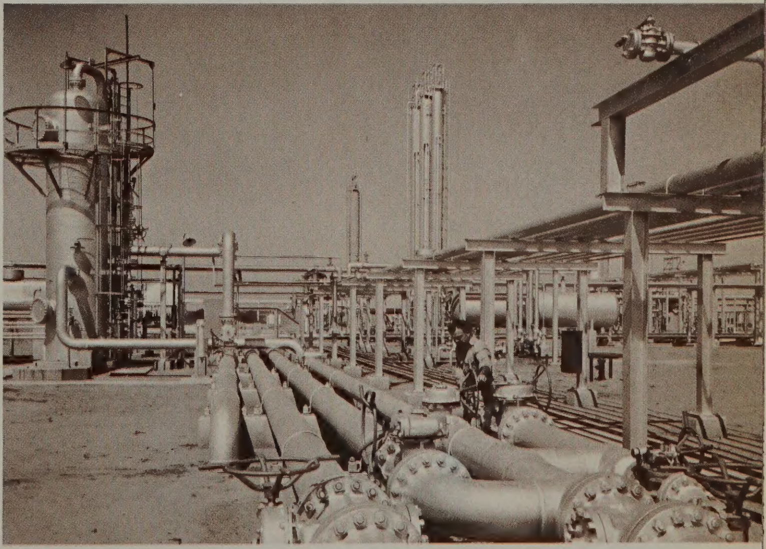
The value of nonmetals produced in Oklahoma is growing. Reserves of clays, gypsum, salt, stone, lime, bentonite, tripoli, volcanic ash, and sand and gravel are substantial. But, for most of these nonmetals, further increases in output will depend on the development of new markets. Total annual value of the nonmetals plus copper, silver, and cement is almost $75 million.

For the past 50 years, the inert element helium has been recognized as a mineral resource of Oklahoma. The State's natural gas is an important source of this valuable element, which is recovered at a plant operated by the Department of the Interior's Bureau of Mines at Keyes. Helium's complete inertness, the ability to be in contact with other elements and compounds without chemically combining with any of them, has caused it to be heavily used in the space industry, in research, in welding, and in a host of other applications. The list is still growing.

In each of the last 17 years, the quantity of helium recovered from natural gas has increased. Marketable production of helium at the Keyes plant of the Bureau of Mines in 1966 was approximately 340 million cubic feet, an increase of 13 percent over that of 1965. During the same period, the value of the helium increased 25 percent.

Only a limited amount of natural gas contains helium at a concentration of 0.3 volume-percent, the level used in computing reserves. If helium is not removed from the natural gas before burning, it is forever lost to the atmosphere. To conserve this limited resource, the Bureau of Mines purchases helium from private natural gas producers and stores it, with any excess of its own production, in underground reservoirs, to meet future requirements. Helium reserves in and near Oklahoma are sufficient to keep the Keyes plant in operation at present capacity well into the next century.

This plant separates natural gas liquids—natural gasoline, liquefied petroleum gases, and dry natural gas.



Water and Power

Oklahoma is one of the few Western States having a large volume of uncommitted fresh water. However, though there is ample water within the State for many decades of use, availability varies in place and time.

In the hilly wooded areas of eastern Oklahoma, streams provide beautiful scenery and many lakes attractive to vacationers, as well as water for mining, industrial, and domestic use. But, while eastern sections have sufficient rainfall and ample streamflow, western areas are deficient.

Most rain occurs in the late spring and early summer months and often comes in torrential downpours accompanied by quick runoff causing high flood damages and minimum benefit to crops and year-round water supply. Ironically, western rains result in runoff to the east where it is not needed.

Because of these conditions, a statewide water distribution system is necessary to assure a thriving economy in central and western Oklahoma. With agricultural, mineral, and industrial potential, these areas have all the resources needed for a growing economy except a dependable water supply for the future.

Two major river basins drain the Sooner State. The Red River, with its tributaries, drains the southern part while the Arkansas River sys-

(Left) Cedar Lake in the Ouachita National Forest serves more than aesthetic purposes. The lake is used during dry years to supplement flow of the Black Fork River. (Right) Water from the W. C. Austin Project irrigates cropland. Here, cotton fields are under irrigation.

tem drains the northern. Together these rivers discharge an average of 30 million acre-feet of water per year, a supply that greatly exceeds municipal needs and has prompted major efforts to store and utilize excess water for other purposes.

Almost 1,600 lakes in the State have more than 10 acres surface area, with the 18 Federal reservoirs ranging in size from 980 acres to 102,500 acres. The two largest Federal reservoirs are Eufaula (102,500 surface-acres) and Lake Texoma (Denison Dam) with a 89,000-acre surface.

Major reservoirs to be completed about 1970 will add 3 million acre-feet of storage to the 10.6 million acre-feet found in large reservoirs in 1965. This total storage of 14 million acre-feet of water covering 840 square miles of surface area is equivalent to a statewide runoff of 4 inches. Since the State averages 5 inches of runoff, a substantial surplus of water will remain for additional storage development to meet future water needs.

More than 1,200 upstream floodwater retarding structures have been built by local Conservation Districts with the assistance of the Soil Conservation Service of the Department of Agriculture. Oklahoma, one of the first and most active States in this type of development, uses upstream impoundments for municipal and industrial water, irrigation, and recreation, as well as flood control.

Although most water used in Oklahoma comes from surface sources, ground water supplies water for drinking and household use for nearly half the people in the State and more than 70 percent of the water used for irrigation. About one-third of the water used in Oklahoma is ground water, and large reserves still have not been fully developed. These supplies are the State's most valuable resource, with an estimated value of several billion dollars.

The most important aquifer in the State lies in the High Plains of the Panhandle. It supplies most of the water requirements for this area

including water to irrigate about 135,000 acres, to meet industrial needs of the natural gas industry and Keyes helium plant, and to supply all the municipal and domestic needs in the area.

Aquifers in the central part of the State supply about 21 million gallons a day for industrial, municipal, and institutional use; a tremendous reservoir of underground water occurs in thick limestone rocks in the northern part of the Arbuckle Mountains. Irrigation water from wells has been successfully developed in Caddo County and in the southwestern part of the State.

Ground water can play an important role in assuring adequate water supplies for the State. Through a cooperative program between the Department of the Interior's Geological Survey, the Oklahoma Water Resources Board, and the Oklahoma Geological Survey, the movement and availability of ground water and the rate of replenishment of this valuable resource are being studied. Information obtained will be used by the public in general and by such governmental organizations as the Oklahoma Water Resources Board which has the responsibility for administering water rights and encouraging the optimum development of the resource.

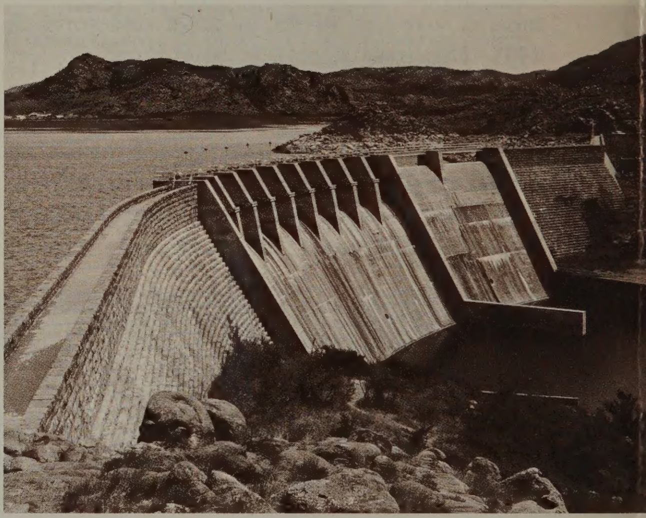
Meeting Water Needs

Although Oklahoma is generally thought of as a dry State, present and future water needs can be met by proper development of surface and ground water resources and by redistribution of surface water from areas of surplus to areas of shortage.

Municipal and industrial water use is highest in priority. Presently, Oklahoma City's water is transported from Lake Atoka, more than a hundred miles southeast, although this involves pumping it uphill to Stanley Draper Lake which is 550 feet higher than Lake Atoka. The Central Oklahoma Project, now being studied by the U.S. Army Corps of Engineers and supported by the Water Development Foundation of Oklahoma, would redistribute up to 1,200 million gallons of water per day, moving it from southeastern Oklahoma to central area cities.

Irrigation is also a growing water user. A 1967 irrigation survey conducted by the Oklahoma State University Extension Service found about 558,803 acres being irrigated, partly from ground water (442,656 acres) and partly from surface water (116,147 acres). Moreover, land classification surveys indicate that about 3 million acres of land in the State are potentially suitable for irrigation.

Increasing awareness of the pollution problem is expected to create a demand for low-flow augmentation, a system of diluting wastes. Low-flow augmentation, which is not intended to replace adequate treatment of wastes at their source, is a relatively new water use not included in most previous planning. Since it often involves the use of large volumes of water, it adds even greater urgency to the need for careful water use planning.



Besides providing irrigation and municipal water supplies, Lake Altus is a center for outdoor recreation.

Water Quality

Though Oklahoma has an abundance of good quality ground and surface water, this water is not always available when and where needed. Natural and manmade pollution problems face the State.

For instance, gypsum and salt deposits degrade the quality of surface and ground water in parts of western Oklahoma. Concentrations are sometimes high enough to render the water unsuitable for municipal, industrial, and agricultural use. Hopefully, advances in desalinization and mineral removal will some day solve this problem.

Industrial, mining, oilfield, and gasfield pollution of water have led to legislation and also voluntary measures on the part of industries and municipalities to dispose of pollutants as harmlessly as possible.

The State's control program is credited with substantially abating municipal and industrial pollution. Responsibility for the quality of water in the State is chiefly in the hands of the Oklahoma Water Resources Board, established by the legislature in 1957. The board is responsible for coordinating the efforts of State agencies concerned with water: the State Department of Health, the State Department of Wildlife Conservation, and the Corporation Commission (charged with pollution control of oil and gas production). The objective is to enhance water quality by encouraging adequate waste treatment by industries and municipalities.

Tenkiller Ferry, site of this dam, was a well-travelled route across the Illinois River in frontier times.

The U.S. Geological Survey in cooperation with the Oklahoma Water Resources Board has for many years maintained a water-quality monitoring system on Oklahoma's streams and lakes. This system provides information on the source and amounts of natural mineral pollutants and manmade pollutants in Oklahoma's streams. In addition, and as important to the development, use, and management of the water resource, the monitoring system has identified large amounts of good quality water, i.e., water which is chemically suitable for industrial, municipal, and irrigation use.

Power

Most of the electric power in Oklahoma is produced by fuel burning, thermal powerplants. Because streamflows are low and erratic in the western part of the State, all hydroelectric powerplants are located on rivers in the east. However, only 34 percent of the hydroelectric powerplant potential has been developed. A very small part of the electric power is produced by internal combustion engines; Oklahoma's first pumped-storage generating plant is near completion. The State has no nuclear plants.

The total generating capacity at the beginning of 1967 was 3.2 million kilowatts. Principally, this consisted of 2.8 million kilowatts of thermal capacity and 363,400 kilowatts of hydroelectric plant capacity. During 1966, thermal powerplants actually produced 96.5 percent of the power and hydroplants produced 3.5 percent.

The State's two largest hydroelectric plants are the Markham Ferry Powerplant of the Grand River Dam Authority of Oklahoma with 108,000 kilowatts and the Corps of Engineers' Eufaula Powerplant on the Canadian River with 90,000 kilowatts. Completion is expected in 1970 of a 110,000-kilowatt hydroplant to be named for the late Senator Robert S. Kerr, which is being constructed on the Arkansas River by the U.S. Army Corps of Engineers.

Also under construction are three other hydroplants: Broken Bow, Keystone, and Webbers Falls, with a combined generating capacity of 230,000 kilowatts. The Grand River Dam Authority's 520,000 kilowatt Salina Pumped-Storage Plant on the Grand River is nearly completed. Six more pumped-storage generation projects have been found feasible, and if developed, would provide an additional 4.8 million kilowatts of generating capacity.

Fish and Wildlife

The story of Oklahoma's wildlife has many chapters and many authors. Mother Nature wrote the first version, but man wouldn't let it stop there. With plow and ax, land-hungry settlers charged headlong into revision, changing prairie to dust bowl, woodland to bare hill, and beauty to ugliness.

Though early wildlife chapters written by man were harsh and wasteful, later chapters showed that enlightened conservation practices were bringing improved water and land uses and returning much game to abundance.

Wildlife Problems

By 1880, the herds of buffalo, elk, and antelope were nearly extirpated, though deer, prairie chicken, and wild turkey continued to be abundant until shortly after statehood.

The first territorial laws to conserve wildlife were established in 1890 when liberal seasons and bag limits were set for the primary game species. In 1907, when Oklahoma became a State, most of the territorial laws were adopted by the State legislature, and by 1909, eight wardens were appointed whose principal duties were to apprehend market hunters. These wardens concentrated their efforts in the freight yards of Guthrie, Oklahoma City, and other rail centers in eastern Oklahoma and confiscated many carloads of quail, prairie chicken, and

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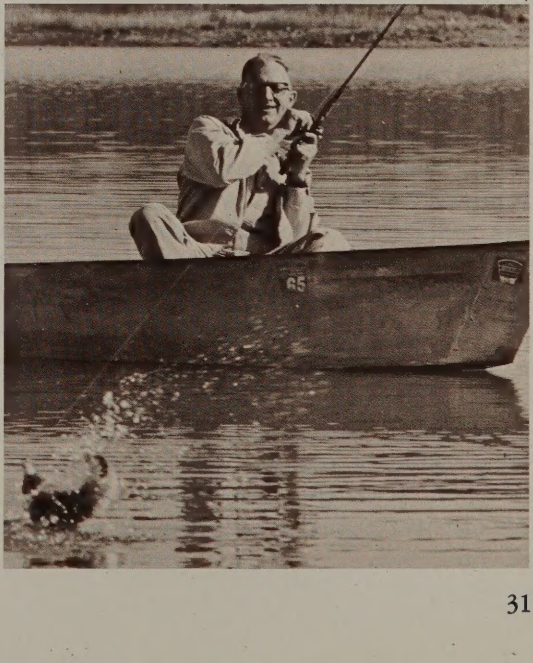
In the 1920's, each square mile of rural area supported a homestead; few species could maintain their numbers as increased hunting and loss of habitat occurred.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deer waiting shipment to markets in New York, Chicago, and other large midwestern and eastern cities.

But, few species could maintain their numbers against hunting and loss of suitable habitat which occurred in the 1920's when each square mile of rural area supported a homestead. By 1930, stringent laws, hunting seasons, bag limits, refuges, and additional law enforcement personnel began to have the desired effect, and populations of wildlife began to increase.

Hunting Today

Today, the white-tailed deer is found in all 77 counties and numbers in excess of 45,000. In far western Oklahoma, a small but healthy population of mule deer is extending its range eastward and now occurs in five counties. Game managers forecast a population of white-tails and mule deer in excess of 100,000 by 1973.

Antelope are found in the Oklahoma Panhandle with an occasional migrant from Kansas showing up elsewhere in the northern portion of the State. They number approximately 350 head and are expected to increase slowly to approximately 1,000 animals by 1975.

Elk are limited to the Wichita Mountains National Wildlife Refuge; exotic fallow deer, to the McAlester Naval Depot; and aoudad sheep, to the Fort Sill Military Reservation. Elk which wander from the Wichita Refuge provide limited hunting each year.

Large numbers of rabbits and squirrels occur throughout most of Oklahoma; furbearers such as the opossum, raccoon, badger, and mink provide much sport and recreation, although the market for such furs has dropped in recent years. Bobcats and coyotes, which are not protected, are hunted extensively for sport.

Wild turkeys were all but nonexistent in the State in 1948. But today, wild turkey populations in Oklahoma are growing at a vigorous rate. From an initial flock of 21 Rio Grande turkeys obtained from Texas, an extensive program of trapping and transplanting wild birds produced an expanding flock of more than 45,000 turkeys in 1967 in the western half of the State.

Most turkey hunting occurs on private lands, but a large number of birds are found on public hunting areas, such as the Black Kettle National Grasslands in Roger Mills County and the Fort Supply Public Hunting Area in northwestern Oklahoma. Other public hunting areas such as Ellis County, Lexington, Hickory Creek on Lake Texoma, and Canton Reservoir all have good turkey populations.

The king of Oklahoma's small game is the bobwhite quail. In some areas of western Oklahoma, populations reach the highest levels known to exist anywhere within the continental United States. Over 100,000 sportsmen annually hunt "Mister Bob" and average better than 20 birds per hunter or more than 2 million birds per year. Some of the best hunting is found on public shooting areas such as Fort Supply Reservoir, Canton Reservoir and the Black Kettle National Grasslands. Farther west in the pinon-juniper country of Cimarron County, the scaled or Mexican blue quail is found in abundance. Blue quail hunting is excellent on the Rita Blanca National Grasslands adjacent to the Texas line.

The greater and lesser prairie chicken inhabit north-central and western Oklahoma, respectively. Both birds were once believed headed for extinction, but changes and improvements in land management practices reversed the trend and today they are numerous enough to allow open seasons.

The exotic ringneck pheasant is established in huntable numbers in the Panhandle and his close relatives, the whitewing and blackneck pheasants show possibilities for establishment in southwestern and eastern Oklahoma.

With the great increase of water acreage in major reservoirs, waterfowl hunting for lesser Canadian and snow geese and the mallard has assumed popularity rivaling dove hunting—formerly a leader in the sport of migratory bird hunting. Doves are found in large numbers throughout most of Oklahoma.

Sport Fishing

In the depression days of the 1930's, Oklahoma was known as one of the "dust bowl States." Today, nothing could be farther from the truth. At latest count, Oklahoma had more than 743,000 acres of water and before the next century rolls around, new dams will swell this figure to well over a million acres.

With an estimated 235,000 farm ponds, many large Federal reservoirs, medium-size State and city lakes, and small, free-flowing streams, Oklahoma offers the angler a variety of experiences. Largemouth bass, smallmouth bass, white bass, crappie, sunfish, and catfish provide excellent fishing sport, and most of the newly introduced species—walleye, northern pike, striped bass, and rainbow trout—are just as tough to net.

Due to the mild climate, anglers can enjoy year-round bass fishing in Oklahoma. The largemouth bass is one of the State's most popular game fish. Unpredictable, it tests the angling skill of the veteran fisherman and often smashes viciously at the unsure offering of the beginner.

The smallmouth bass is acclaimed by many fishermen as the top trophy of the bass family. It is often said that pound for pound, the smallmouth is the gamest fish in Oklahoma. Commonly called Brownies, a name derived from their coloration, smallmouth are found in the eastern portion of the State.

Oklahoma offers spotted bass fishing for both lake and stream anglers. Some of the better spotted bass lakes in southeastern and northeastern Oklahoma are Texoma, Tenkiller, Oologah, Bluestem, Greenleaf, Hudson (Markham Ferry Dam), Murray, Eucha, and Spavinaw. Several northeastern streams also provide good spotted bass fishing, such as the Illinois, Caney, Verdigris, Barren Fork, Big Lee Creek, Spavinaw Creek, and Polecat Creek.

Excellent Kentucky bass fishing can be found on the Kiamichi, Mountain Fork, Red, Little, Poteau, Glover, and Blue Rivers. Most of these streams cross forest lands and are open to the public.

In recent years, the white bass has become a very popular sportfish in Oklahoma. Although native to the State, white bass never existed in great number until the construction of large reservoirs. The success of transplanting has contributed greatly to its abundance.

In Oklahoma, the white bass or "sandy" makes up about one-fifth of the total catch of all species. Excellent fishing for white bass exists in Lakes Texoma, Tenkiller, Grand, Fort Gibson, Hudson, Canton, and Eufaula.

Another popular game fish is the crappie. Native to the State, it is present in all public fishing waters, with the largest populations in reservoirs. Submerged brush piles, tree roots, and stump beds are favorite habitat for the crappie. Here they find shelter and the essentials of their diet, insects, minnows, small fish, and crustaceans.

To Oklahomans, channel catfish, flathead, and blue catfish are game fish—and with good reason. Channel and flathead catfish are particularly abundant in all major reservoirs. Channel catfish are also abundant in farm ponds where they grow to great size. Blue catfish thrive in Lake Texoma and Lake Thunderbird.

Oklahoma's many reservoirs offer a tremendous acreage of new environments with great potential for new species of fish. Along with the native species, exotics such as the walleye, northern pike, rainbow trout, muskie, and the anadromous striped bass are showing promise in some of the reservoirs and tailwaters. Canton Reservoir, with a well-established population of walleye, produces lunkers up to 10 pounds. The tailwaters of Tenkiller Ferry Reservoir have developed into an exciting rainbow trout fishery, and Lake Carl Etling in the Oklahoma Panhandle has yielded 18-month-old northern pike up to 37 inches long.

Fish for Livelihood

In a recent year, commercial fishermen harvested almost 900,000 pounds of buffalofish, carp, catfish, drum (sheepshead), paddlefish, and white bass from Oklahoma's reservoirs and portions of the Red and Arkansas Rivers. The catch, valued at $100,000, was marketed for use as human and animal food.

Oklahoma has unharvested stocks which could support a larger commercial fishing industry. Expansion, however, must await technological developments, additional biological and management information, less restrictive local regulations, and a more stable market for fishery products.

Recreation and Tourism

Though Oklahoma is inland, many of her recreation areas center on water. Lakes and streams are used for fishing, swimming, boating, and water-skiing, as well as many other sports.

Opportunities for relaxation are varied. One can "rough it" or stay in luxurious lodges; climb mountains or visit the plains; play golf or tennis or watch a sailing regatta.

Though the visitor from the East may find rodeos and Indian festivals foreign, for Oklahomans, these are just another way of preserving a rich frontier heritage.

National Parks

Two units of the National Park System are located in the scenic Arbuckle region of southern

Oklahoma: Platt National Park and the Arbuckle Recreation Area.

Platt National Park, adjoining the city of Sulphur, was set aside by Act of Congress of July 1, 1902, as the Sulphur Springs Reservation, to preserve, protect, and develop the waters of the springs for the use and enjoyment of the people. The area was established as a national park by joint resolution of Congress of June 29, 1906, and its name changed to Platt in honor of Senator Orville Hitchcock Platt of Connecticut, a longtime friend of the Indians.

The park lies in the foothills of the Arbuckle Mountains at an elevation ranging between 910 and 1100 feet. The fresh-water and cold mineral-water springs, sparkling streams, wooded valleys, and gently rolling grass-covered hills all combine to give the area a unique beauty.

Tradition has it that the spring waters were used by Indians for curative purposes long before the coming of the white man, who also considered the waters beneficial in the treat-

A camping trip to Roman Nose State Park will long be remembered by even the tiniest person in the family.

ment of disease. The National Park Service protects and maintains the springs for public use, but makes no claim as to their medicinal value.

Spring-fed Travertine Creek flows through the eastern end of the park, while Rock Creek enters from the north and winds its way through the western half. To the south of Rock Creek is Bromide Hill, a wooded bluff rising 140 feet above the Bromide Pavilion where waters from two mineral springs—Bromide Spring and Medicine Spring—are dispensed.

From the summit of Bromide Hill, easily reached by road and trail, visitors obtain a fine panoramic view of the countryside. Along the horizon to the southwest lie the highlands of the Arbuckle Mountains and the lowlands of the Washita River Valley; to the east, for a distance of 3 miles, most of the park can be seen stretching along the courses of Rock and Travertine Creeks.

Near the center of the park, a small herd of bison reminds visitors that millions of these animals once roamed this section of North America unmolested, except for small hunting parties of Indians. Other animals found in the park include raccoon, fox, skunk, opossum, armadillo, rabbit, and bobcat. More than a hundred species of birds have been recorded.

The many species of plants furnish a display of ever-changing color. This parade of color ranges from the springtime spectacle of the showy redbud trees to the brilliance of autumn leaves—an intermingling of the red and scarlet hues of the oaks with the gold and yellow of the cottonwoods.

Exhibits in the park museum, located near the Bromide Pavilion, provide visitors with

Families enjoy wading in spring-fed Travertine Cheek, which flows through the eastern end of Platt National Park.

information about the geologic story of the springs and other natural features, as well as the human history of the region.

The Arbuckle Recreation Area has as its central feature Lake of the Arbuckles, a three-pronged reservoir on Rock, Buckhorn, and Guy Sandy Creeks. It was created by the construction of the Arbuckle Dam on Rock Creek by the Department of the Interior's Bureau of Reclamation. The recreation area is administered by the National Park Service under an agreement with the Bureau of Reclamation.

Development of the recreation area for public use is still in its early stages. Boat ramps, parking, picnicking, and other visitor facilities have been built on the lakeshore. Additional developments, such as roads, trails, beach areas, water and sewer systems, and campgrounds are planned.

Both Platt National Park and Arbuckle Recreation Area are easily accessible. The park may be reached via State Route 7, which intersects with U.S. 77 nine miles to the west at Davis, or via U.S. 177, which goes through the park and connects with U.S. 66 to the north and U.S. 70 at Ardmore, 23 miles to the south. The recreation area, which is 5 miles southeast of the park, may be reached via State Routes 7 and 110, which connect with U.S. 77 and 177.

National Forest and Grasslands

Some 30 years ago, the Civilian Conservation Corps built Cedar Lake and Billy Creek recreation areas in the newly extended Oklahoma end of the Ouachita National Forest; the Forest Service has continued to provide facilities for those who want to enjoy the outdoors. Today,

Though Oklahoma is inland, many of her recreation areas center on water. Here, water-skiers display their skill.

the forest includes seven developed recreation areas which have more than 150,000 visitor-days use annually.

The Black Kettle National Grasslands and the Rita Blanca National Grasslands also offer exceptional recreational opportunities. Facilities introduced in recent years for campers, picnickers, hunters, and fishermen, include camp and picnic areas, manmade lakes, and nature trails.

State Parks

There are 21 State parks and 14 State recreation areas in Oklahoma planned to provide for the varied recreational needs of a heterogeneous public. No admission fee to the State parks or recreation areas is charged. Among the parks are:

Arrowhead and Fountainhead State Parks on Eufaula Reservoir. Both parks feature deluxe resort lodges with golf courses and extensive camping areas. Water sports can be enjoyed on the lake; each park contains a marina and rental boats.

Lake Texoma State Park. Lake Texoma is one of the largest manmade lakes. The park has marinas, a golf course, a lodge, cottages, and large camping areas along the shoreline of the lake.

Robbers Cave State Park. According to legend, Belle Starr and other notorious outlaws found refuge in this cave from U.S. marshals who were trailing them. The park is located in the Sans Bois Mountains of eastern Oklahoma. Water sports can be enjoyed on Lake Carlton.

Greenleaf State Park. The lake in this park is a fisherman's delight. Good catches of bass and crappie are almost guaranteed. Rustic cabins are available.

Lake Tenkiller State Park. Located in the scenic Cookson Hills, the park consists of three peninsula areas on Tenkiller Ferry Reservoir. Waterskiing and other water sports are featured on the clear-water lake.

Boiling Springs State Park. This site was a favorite winter-camping spot for Plains Indians and Spanish explorers of the 16th and 17th centuries. The springs which bubble forth provide water for the swimming pool. The small lake is surrounded by picnic and camping areas.

Beavers Bend State Park. This pine-covered haven is traversed by Mountain Fork River. The river is dammed to form a small lake used for fishing and swimming.

Keystone State Park. A dam below the confluence of the Arkansas and Cimarron Rivers forms a lake which is the center of activities at Keystone.

Red Rock Canyon State Park. The park, located on the floor of Red Rock Canyon, affords a scenic view of towering walls of red sandstone.

Further information about these and other State parks may be obtained from the Oklahoma Industrial Development and Park Department, Information Division, Will Rogers Memorial Building, Oklahoma City, Okla. 73105.

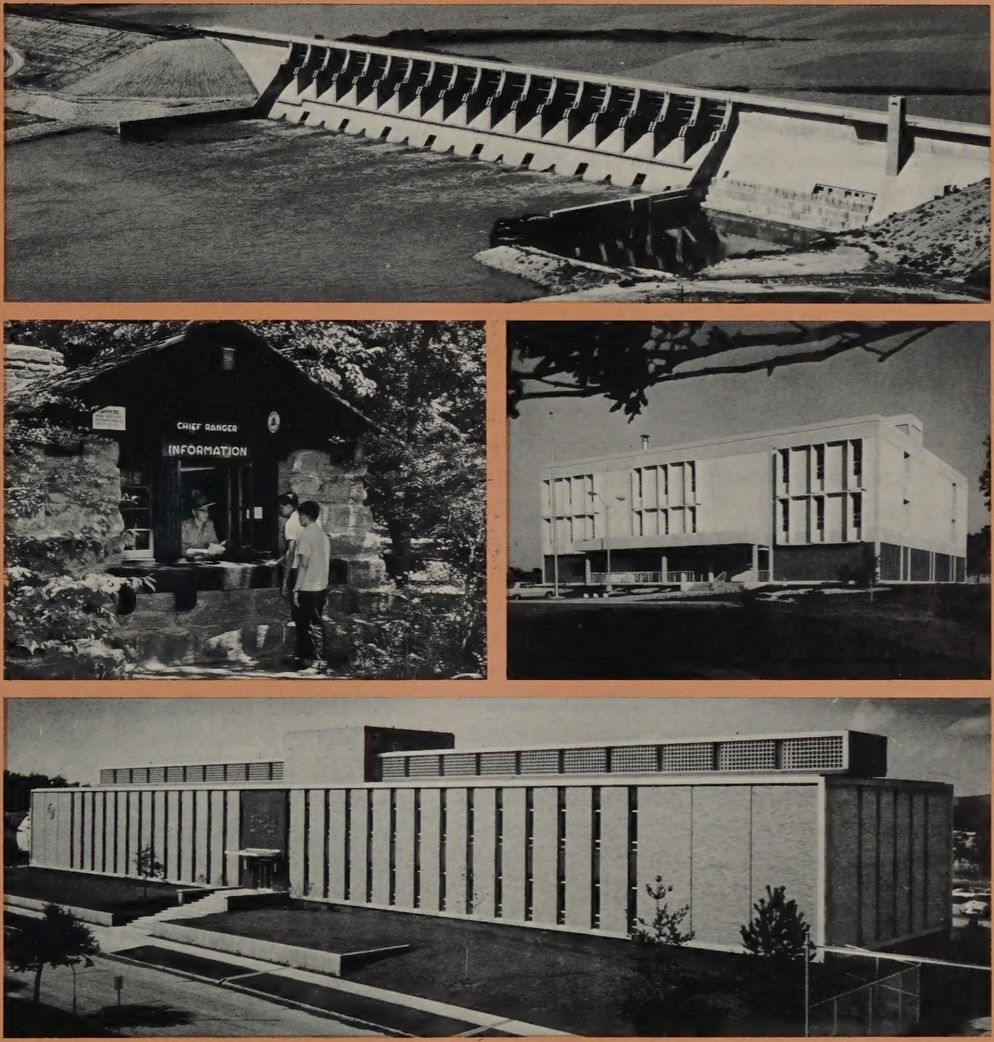
Other Recreation Facilities

The National Cowboy Hall of Fame and Western Heritage Center in Oklahoma City is a shrine honoring the men and women who built the West. A map, complete with sequence lighting, is used to narrate the story of the westward push across the United States. In the Hall of Great Westerners, homage is paid to famous pioneers, and the Rodeo Hall of Fame recalls some of the greatest rodeo contestants.

In Claremore, the hometown of Will Rogers, stands a memorial to Oklahoma's favorite son. The Will Rogers Memorial and Museum houses mementos of Rogers' life—documents, personal effects, paintings, and statues.

The many privately owned recreation facilities in Oklahoma include areas for horseback riding, golf courses, and lakes. Lists of all these facilities are not available from any single source. Travel bureaus and agencies, motel and hotel associations, gasoline companies, airlines and railroads, local chambers of commerce, and outdoor clubs and organizations can supply information on many of the privately owned facilities. Local inquiry will reveal others. Information is also available from the Oklahoma Planning and Resources Board, Will Rogers Memorial Building, Oklahoma City, Okla. 73105.

Programs of Federal Natural Resource Agencies



(Top) Keystone Dam has been completed. (Center left) A park ranger answers questions. (Center right) The Robert S. Kerr Water Research Center is a well-equipped laboratory. (Bottom) At the Bartlesville Petroleum Research Center, Government scientists work to advance technology and conserve fuel resources.

The natural resource functions of the Federal agencies represented in this booklet are extensive and detailed and are only briefly described. Additional information can be obtained by contacting the offices noted in the following programs section.

U.S. Army Corps of Engineers

U.S. Army Corps of Engineers' projects in Oklahoma include improvements of rivers and waterways for the control of floods, hydroelectric power, navigation, water supply, water quality control, recreation, irrigation, fish and wildlife conservation, and bank stabilization.

Twelve reservoirs and six local protection projects have been completed in the State. The reservoirs include Canton, Denison (Lake Texoma), Eufaula, Fort Gibson, Fort Supply, Great Salt Plains, Heyburn, Hulah, Keystone, Oologah, Tenkiller Ferry, and Wister. The local protection projects include the Enid Diversion Channel, Jenks Levee, Oklahoma City Floodway, Tulsa and West Tulsa Levees, Polecat Creek, and South Deer Creek.

Corps of Engineers projects presently under construction include five locks and dams for navigation, five multipurpose reservoirs, and one bank stabilization project for navigation. The projects under construction are W. D. Mayo Lock and Dam, Robert S. Kerr Lock and Dam, Webbers Falls Lock and Dam, Arkansas River Bank Stabilization, and Kaw Reservoir, all on the Arkansas River; Lock and Dam No. 17, Lock and Dam No. 18, on the Verdigris River; Optima Reservoir on the North Canadian River; Pine Creek Reservoir on Little River; Broken Bow Reservoir on the Mountain Fork River; and Hugo Reservoir on the Kiamichi River. Gates are being installed on the spillway at Oologah Reservoir which will permit the lake to be raised 30 feet for water supply, recreation, and navigation.

The Corps of Engineers is continuing planning for eight multiple-purpose reservoirs and is preparing detailed project plans and specifications for eight local protection projects in Oklahoma. In addition, five other reservoir projects are authorized by Congress for construction.

Studies and reports are made to provide technical assistance for flood plain management. Emergency flood fighting and levee repair, and issuance of permits for the erection of structures in and over navigable water ways are also functions of the Corps of Engineers.

There are access roads and recreational facilities at all Corps of Engineers' reservoirs for public use, with commercial services supplied by private industry on leased sites. In addition, State and local government agencies have developed large public use areas under lease agreement on reservoir projects. Under this arrangement, Oklahoma operates State parks at Broken Bow, Denison (Lake Texoma), Eufaula, Fort Gibson, Great Salt Plains, Heyburn, Keystone, Oologah, Tenkiller Ferry, and Wister reservoirs. The Oklahoma Department of Wildlife Conservation and the Fish and Wildlife Service control large acreages at Corps of Engineers' reservoirs for wildlife management purposes including public hunting and fishing, refuges, and general recreational uses. The popularity of these reservoir projects is evidenced by a total visitation of more than 16,000,000 visitors in 1966.

In addition to constructing water resources improvements, the Corps formulates rules and regulations for the use of storage space allocated to flood control at reservoirs constructed wholly or in part with Federal funds. The Corps carries out rescue work during floods and other emergencies and repairs, restores, and strengthens levees and other flood control works threatened or destroyed by floods.

Additional information on the activities of the Corps of Engineers in Oklahoma can be obtained from the District Engineer, Tulsa District, Corps of Engineers, U.S. Army, Post Office Box 61, Tulsa, Okla. 74102.

Office of Coal Research

The Office of Coal Research of the Department of the Interior is interested in increasing the market potential for Oklahoma's 1.5 billion tons of coal (assuming 50 percent recovery), both for conventional uses and new uses. Of the many research proposals received from inventors, research organizations, private industry, and universities, the Office of Coal Research sponsors those which offer the best prospect for technological and economic feasibility.

For example, proposals for the study of the market potential of Oklahoma coals were received, and a contract was awarded for the study of markets for western coals, including Oklahoma's. The contractor made the Oklahoma coal study with the cooperation of the Chief Mine Inspector of the Oklahoma Department of Mines, and other officials of State and local governments, universities, and private companies. The report, "The Potential Market for Midwestern and Alaskan Coal and Lignite" has been commended by the Governor's Council for the Development of the Coal Industry in Oklahoma. It has served to stimulate an unusually high degree of interest in Oklahoma coal lands.

Technological developments being sponsored by OCR have potential for enlarging markets for Oklahoma coals. These projects include development of processes for converting coal to gasoline, pipeline quality gas, low-B.t.u. gas, and crude oil; new methods of combustion in coal-fired boilers; use of flyash to make brick and other construction materials; use of coal for sewage treatment; conversion of coal to power by new, more efficient methods which involve reduced air pollution and require less water; electronic computer programs for reducing mining costs; and coal preparation to reduce boiler corrosion.

Contractors' reports on OCR-sponsored research are kept by the Oklahoma State University Library, Stillwater, and the University of Oklahoma Library, Norman. Copies are usually available for purchase (subject to supply limitations); a list of these reports may be obtained by writing to the Office of Coal Research, Interior Department, Washington, D.C. 20240.

Bureau of Commercial Fisheries

The Bureau of Commercial Fisheries of the Department of the Interior has a strong interest in assisting the State to develop the extensive, currently under-used, populations of carp, buffalo fish, quillback, and drum (sheepshead) in Oklahoma's rivers and reservoirs. Under the Commercial Fisheries Research and Development Act administered by the Bureau, Oklahoma is conducting a research project on reservoir commercial-fish-stocks to improve management of these species, to evaluate the environmental conditions affecting production of fish populations, and to measure the effect of various levels of fishing intensity on sport and commercial species. The Bureau also plans individual water resource projects and comprehensive river basin studies.

In cooperation with the State, BCF collects and analyzes statistics on the poundage and value of the commercial fish harvest.

An educational (consumer and vocational) program to promote consumer use of fishery products and emphasize the value of fish in the diet is being conducted by the Bureau. The largely unrealized potential of fish produced in the Mississippi Basin, including Oklahoma, is being made known through public relations programs and the news media.

The Bureau is also participating in reservoir biological studies, exploratory fishing experiments, and gear improvement operations. These investigations are aimed at the development of more efficient and selective methods of harvesting Oklahoma's commercial fish.

Additional information on programs of the Bureau of Commercial Fisheries may be obtained from the Regional Office Bureau of Commercial Fisheries, 5 Research Drive, Ann Arbor, Mich. 48103

Federal Water Pollution Control Administration

Water pollution control at the national level is administered by the Federal Water Pollution Control Administration of the Department of the Interior. In cooperation with other water resource agencies—Federal, State, municipal, and industrial—the Administration engages in long-range planning, research and training, enforcement, and technical and financial assistance to control water pollution. The aim of the program is to protect, conserve, and improve water for public supply, industry, agriculture, recreation, and propagation of fish and wildlife.

Since 1957, almost 300 Federal grants, totaling over $14 million helped build more than $53 million worth of sewage treatment facilities in Oklahoma. The immediate goal of the State Department of Health is secondary treatment of sewage for all communities in the State, as soon as possible, with a long-range goal of more advanced treatment. Secondary treatment is about 85 to 90 percent effective in cleansing waste waters.

In May 1966, the FWPCA opened the Robert S. Kerr Water Research Center, a well-equipped laboratory located at Ada, Okla. Within a year, more than half a dozen studies requested by the State were underway on pollution problems encountered throughout Oklahoma.

The major undertaking the center's first year was a project to develop methods of removing phosphates from sewage, a problem of nationwide importance. Field tests were made at Oklahoma City, Tulsa, and Enid, as well as other cities throughout the country.

The center was requested by the State Department of Health to undertake a 3-year study of deterioration of water quality in the Fort Gibson Reservoir in order to develop a plan for control of pollution in the entire watershed of the lake. Yet another study, requested by the State Water Resources Board, deals with the effect of irrigation of 16,000 acres of land below Canton Reservoir on the water quality of the North Canadian River.

In addition, the center has been studying the sources of brine pollution, the effect of impoundment on the composition of water in the hundreds of manmade lakes in Oklahoma, and the effect that extension of navigation upstream in the Arkansas River has had on water quality.

The Federal Water Pollution Control Administration also conducts the Arkansas-Red River Basins Comprehensive Water Pollution Control Project, a long-term program to control mineral pollution in the two major drainage systems of Oklahoma. The program consists of: experimental control projects carried out in conjunction with the State and the U.S. Army Corps of Engineers; research studies in cooperation with State agencies; and operation of a stream monitoring and pollution surveillance network. The latter serves as a supplement to the surveillance network maintained at the research center.

Other FWPCA programs offer aid to the State in the development of programs and assistance in training technical personnel. Research, training, and demonstration grants, as well as a variety of research fellowships, have been awarded to the University of Oklahoma and to Oklahoma State University.

Additional information about the Federal Water Pollution Control Administration can be obtained from the South-Central Regional Office, Federal Water Pollution Control Administration, U.S. Department of the Interior, 1114 Commerce Street, Dallas, Tex. 75202.

Forest Service

By 1930, much of the forest land in eastern Oklahoma was endangered. The virgin timber was gone and there was no protection from the many forest fires which occurred each year. The value of the land and its resources was decreasing rapidly.

Seeking to correct this situation, the State requested that the Federal Government establish a national forest in the area, and in 1931, the Ouachita National Forest in western Arkansas was extended into Oklahoma.

Ouachita National Forest

Oldest national forest in the South, the Ouachita was established in December 1907 and is administered from a headquarters office in Hot Springs, Ark. The forest now includes 237,850 acres in Oklahoma with three Ranger Districts located in Heavener, Talihina, and Idabel. Managed to provide a continuing supply of wood, water, forage, and wildlife and to include a recreation area, it has produced an amazing number of acres of rehabilitated forest.

Today, the Forest Service of the U.S. Department of Agriculture maintains 207,400 acres of commercial forest land in Oklahoma. This timberland, when first acquired by the Federal Government, was of negligible benefit to the local economy. Much of the timber had been clear-cut; trees for growing stock were sparse and of poor quality. Since the establishment of the Ouachita in Oklahoma, the volume of national forest timber cut has amounted to more than 94 million board feet.

A vital role of the managed forest land in Oklahoma is the storage and drainage of fresh, clean ground water for drinking, irrigation, recreation, and industrial use. There are 60 watersheds on the national forest in Oklahoma and water resources are considered in planning all forest uses. The Ouachita National Forest is the watershed for the Black Fork River—the water supply for Heavener, Okla. During dry years, the Forest Service releases water from Cedar Lake to supplement flow in the Black Fork.

Woodland grazing is another highly important use of the Ouachita National Forest. The Forest Service has established a 7-month grazing season to keep other land uses and forage production in balance. Now, 85 permittees have 2,550 cattle in the national forest. National forest improvements instituted for grazing permittees include 97 miles of fence and 53 stock ponds.

One of the major developments within the Ouachita is the 55-mile Talimena Scenic Drive, a $7-million project now under construction. The greater part of this scenic drive—37 miles—is in Oklahoma. Plans call for construction of 44 recreation sites along this drive, including camping and picnicking areas, 26 vistas, two information stations, a visitor information center, five historical sites, a natural area, and numerous trails.

To protect the fragile and long-overused soil, Forest Service scientists make sure special measures are taken to eliminate erosion after road and trail construction, timber harvesting, fire, or recreation usage in the forest.

National Grasslands

Across the State—nearly 300 miles west of the Ouachita National Forest—the Forest Service maintains two tracts of managed grasslands. A small portion of the rolling, 300,000-acre Panhandle National Grasslands, the 46,607 acres in Oklahoma includes 30,968 acres of the Black Kettle National Grasslands and 15,639 acres of the Rita Blanca National Grasslands.

Though richly productive now, the national grasslands in Oklahoma were part of the great dust bowl of the 1930's where wind and drought finally defeated over-zealous efforts to farm acreage better left to native grass. Rehabilitation was undertaken by the U.S. Department of Agriculture's Soil Conservation Service in 1938 and was assumed by the Forest Service in 1953. Grass, the only suitable crop for these windswept lands, has been reestablished. Soil improvement and vegetation progress are periodically appraised.

Scientifically contoured and managed, Oklahoma's national grasslands are an important source of revenue from paid stock-grazing permits. In a recent year, more than 3,000 head of livestock were allowed to graze on these grasslands under paid permit—a percentage of which goes into county treasuries.

Aid to Private Woodland Owners

Of increasing importance to woodland owners in Oklahoma are the Federal-State cooperative programs under which the Forest Service helps protect and improve management of privately owned forests.

In cooperation with the Oklahoma State Board of Agriculture, the Forest Service contributed financial and technical assistance to requesting timberland owners for tree planting, protection from fire or forest insects, and harvesting and marketing of forest products. In this way, the Forest Service in Oklahoma assists in the management of an annual average of 2,000 acres—property of some 250 private owners—and participates in the distribution of more than 800,000 trees each year from State or privately owned nurseries.

Additional information about Forest Service programs in Oklahoma may be obtained by writing: U.S. Forest Service, Att'n: Regional Forester, 50 Seventh Street NE., Atlanta, Ga. 30323; Supervisor, Ouachita National Forest, Box 1270, Federal Building, Hot Springs National Park, Ark. 71902; Panhandle National Grasslands, Room 803, Barfield Building, Amarillo, Tex. 79101.

Geological Survey

Water-resource investigations, topographic mapping, and supervision of mineral leasing on Federal and Indian lands are some of the activities of the U.S. Geological Survey in Oklahoma.

Water-resource investigations conducted by the Geological Survey in Oklahoma determine and describe the location, quality, quantity, and behavior of the natural water supply. Water above and below the land surface is studied to obtain information needed by development agencies to provide dependable water supplies and to solve various technical problems related to the control and management of water resources.

Basic water data usually is collected in cooperation with State, municipal, and other Federal agencies. Continuing programs over the years have resulted in the accumulation and publication of a wealth of hydrologic data, including records of streamflow, ground-water levels, and concentrations of the principal chemical constitutents of ground and surface water. Records of flood flows of streams indicate the tremendous supply of unused waters available for development within the State.

The Geological Survey also prepares interpretive reports on the availability and quality of water in specific areas, such as river basins. Some reports describe the geologic environment of the water resources and provide a quantitative appraisal of the water situation. Such information is necessary to solve water problems. For example, information gained from the Geological Survey's gaging and monitoring of water resources provides facts which have a fundamental bearing on the allocation and management of water resources.

Topographic Mapping

Topographic maps prepared and published by the Geological Survey show the shape of Oklahoma's land surface, water features such as lakes and rivers, and manmade features such as roads, boundaries, and cities. Topographic mapping in Oklahoma is financed either by Federal funds or by a cooperative program in which costs are shared by the State and the Geological Survey on a 50-50 basis to complete mapping that is of mutual interest.

Topographic maps in the 1:250,000 series, on which 1 inch represents about 4 miles, are available for the entire State. Maps in either the 7½-minute series (1 inch represents 2,000 feet) or the 15-minute series (1 inch represents about 1 mile) have been published for about 50 percent of the State, more than 34,200 square miles. Additional areas of about 2,000 square miles are being mapped annually using modern techniques. A long-range plan provides for complete modern topographic mapping of Oklahoma by 1976.

The present topographic mapping covers areas scattered throughout the State, however, much mapping remains to be done in the northeast and northwest. When these maps have been completed, they will provide basic data which is essential for the complete inventory and investigation of the State's mineral and water resources and for environmental and land-use studies.

Mineral Leasing

The Geological Survey supervises nearly 5,600 oil and gas and mineral leases, covering 826,000 acres of Federal and Indian lands in Oklahoma. The annual value of mineral production on leased land is about $30 million and annual royalties returned to the United States and the Indians amount to more than $3 million.

The objective of the Survey's supervision of mineral leases is to provide stewardship over the mineral lands of the Federal Government and the Indians. Promotion of exploration and development of oil and gas and minerals on such lands must meet national and local needs, and production methods must provide the maximum recovery of the mineral resources consistent with the protection of other resources.

Additional information about programs of the Geological Survey in Oklahoma can be obtained from the U.S. Geological Survey, 200 Northwest 4th Street, Room 4301. Oklahoma City, Okla. 73102.

Bureau of Indian Affairs

The Department of the Interior's Bureau of Indian Affairs serves some 29 tribes within Oklahoma through area offices at Muskogee and Anadarko. Virtually every type of Bureau service is represented to some degree—from education, employment assistance, and welfare assistance, to the promotion of economic development of Indian lands. Health services are provided by the U.S. Public Health Service which maintains six hospitals and nine health centers for Oklahoma Indians.

The majority of the State's Indians live among the general population with some rural communities being comprised almost entirely or entirely of full-blooded Indians. There are still tracts of land held in trust by the United States for individual Indians and tribes.

Education

Education is perhaps the most basic of the Bureau's services. While the responsibility for educating the great majority of Indian young people in Oklahoma is met by local public school systems, the Bureau operates boarding institutions at Tahlequah, Chilocco, Concho, Lawton, Anadarko, and Wyandotte. School programs are designed to fulfill special needs such as language study and vocational training for Indian students from other States as well as Oklahoma. In a few localities BIA provides dormitory facilities near public schools for Indian children who live beyond normal commuting distances.

At Concho, Okla. the Bureau of Indian Affairs has an elementary and a junior high school with a program designed especially for those children who have had neither a broad educational background nor a variety of social experiences. The school currently serves about 256 students from various parts of the United States.

School districts that undertake the education of Indians living on tax-exempt lands incur a considerable financial burden. A portion of the Federal financial assistance provided to such districts is distributed through the Bureau of Indian Affairs, under the Johnson-O'Malley Act of 1934.

Employment Assistance

Since 1956, training has been a feature of yet another Bureau activity—employment assistance. This versatile program provides highly individualized services for Indians who choose to move into urban centers where employment opportunities are better than in their home areas.

Initial interviews and testing, job placement, transportation to the new locality for the Indian and his family, and even assistance in finding housing and schools, are features of the program. If needed, the Bureau will arrange for the worker to receive free adult vocational training at an approved institution or on-the-job training, with the cooperation of his new employer.

The employment assistance program in Oklahoma has meant jobs for scores of Indians and successful adjustment to urban life for them and their families.

Economic Development

As in other Indian areas, the Bureau of Indian Affairs is working in Oklahoma to promote full use and development of all Indian resources.

Bureau personnel provide technical assistance in the proper management of Indian lands. An extensive soil and moisture control program acquaints Indian landowners with effective methods of dealing with such classic problems as soil imbalance, erosion, and irrigation.

Through joint BIA-Indian efforts, much land that might otherwise be useless is made arable for cultivation or lease by the Indian owner.

Some Oklahoma Indians—notably the Osages—have been fortunate in the discovery of oil and gas on their lands. Income to Indians from mineral leases, royalties, bonuses, and ground rentals has totaled more than $16 million in a single year.

On the other side of the coin, many Indians still live in poverty, particularly those in isolated rural communities. The Bureau encourages the development of industrial and business enterprises in these areas to create jobs and spur local economies. New industries attracted to Oklahoma through Bureau efforts include Sequoyah Mills' two carpet plants at Anadarko and one furniture factory at Elk City, a ladies hosiery mill at Pawnee, as well as enterprises at Baron, Durant, and Wewoka. On-the-job training for Indians is conducted in several of these plants.

Road construction and improvement, forest preservation, and the construction and improvement of housing and community centers in Indian communities are concerns of BIA, as is the development of Indian lands having potential for recreation-based activities.

Credit and financing assistance, arranged with local financial institutions or provided directly by the Bureau, has given many Indian businessmen and farmers a good start.

Income from Claims Awards

Under special legislation, the Bureau of Indian Affairs is responsible for distributing awards made by the Indian Claims Commission to Indian tribes. These awards represent the settlement of Indian claims made against the United States, usually for insufficient payment for tribal lands ceded to the Federal Government during the past century.

Examples of awards made to Oklahoma Indians include: $14,400,000 to the Cherokee Nation; $4,650,000 to the Miami Tribe and Miami Indians of Indiana; $7,300,000 to the Pawnee Tribe; $1,300,000 to the Shawnee; and $2,100,000 to the Citizen Band of Potawatomi Indians.

Additional information on the programs of the Bureau of Indian Affairs in Oklahoma can be obtained by writing the Anadarko Area Office, Bureau of Indian Affairs, U.S. Department of the Interior, Federal Building, Anadarko, Okla. 73005 or Muskogee Area Office, Bureau of Indian Affairs, U.S. Department of the Interior, Federal Building, Muskogee, Okla. 74401.

Bureau of Land Management

The Bureau of Land Management is responsible for about 8,300 acres of public domain lands in Oklahoma of which only 1,700 acres may be applied for under the various public land laws. BLM periodically offers lands for sale to the highest bidder. The purpose of these sales is to eliminate costly administrative burdens involved in the trusteeship of widely scattered and difficult-to-find parcels or small tracts of irregular size in 24 of Oklahoma's 77 counties. The acreage not available for disposition is administered by BLM and revenues are collected from the use of these lands.

In addition, BLM administers 2,560 acres of so-called Choc-Chic lands which are remnants of surface lands and mineral rights purchased in 1947 by the United States from the Choctaw and Chickasaw Indian nations.

Working closely with Oklahoma, BLM is striving to fulfill the remaining 600 acres of the 3,132,736 acres of statehood grant lands to which Oklahoma is entitled.

BLM annually conducts competitive oil and gas leasing on about 8,000 acres of land within known geological structures on which the United States owns the mineral rights. Income from such leasing on public domain and other U.S. lands amounts to about $670,000 in a typical year, in addition to annual rentals and royalties. This revenue comes from "bonus offers" in competitive bidding.

In areas of Oklahoma outside the known geological structures, BLM annually conducts simultaneous oil and gas leasing on 2,000 to 3,000 acres—again, on lands to which the

United States holds the mineral title. Usually four or five parcels averaging 40 acres each come up for lease each month.

Additional information about activities of the Bureau of Land Management in Oklahoma may be obtained from the Bureau of Land Management, P.O. Box 1449, Santa Fe, N. Mex. 87501.

Bureau of Mines

A large part of the work done by the Department of the Interior's Bureau of Mines in Oklahoma is concerned with the conservation of the State's principal mineral resource—petroleum. Nevertheless, virtually every mineral of economic importance is covered by the Bureau's varied program. Bureau scientists and engineers work constantly in close cooperation with their counterparts in State agencies and with industrial representatives to assure the wise development and use of Oklahoma's mineral resources and to promote safety in mineral industries.

Bartlesville Research Center

At a time when conservation practices in the oilfields and refineries left much to be desired, when petroleum research was in its infancy, and when, for the first time in history, a nation struggled with the task of supplying a war technology that depended increasingly on energy from petroleum, the Department of the Interior established the first Government research center devoted solely to the conservation of petroleum. Bartlesville, Okla., was selected as the site of this pioneering center, which has now been operated for half a century by the Department's Bureau of Mines.

The center has played a leading role in firmly establishing petroleum recovery on scientific and engineering principles. Encouragement of research in the early days by the Bureau not only laid the foundation for later outstanding research efforts of the industry, but it also resulted in the hiring by industry of many Bureau-trained scientists and engineers. Besides their skills and talents, these men brought to private enterprise an understanding of the need for conservation practices in the development of petroleum and other natural resources.

Over the years the Bureau has conducted both theoretical and practical studies and has constantly encouraged the application of its findings by industry. Development of basic knowledge of the properties of petroleum and the characteristics of the porous-rock reservoirs in which it is found have been the object of much of the research effort. The results of this work have been used by industry to increase the variety and quality of products that can be obtained from crude oil and to improve the efficiency of oil-recovery techniques.

Moreover, the Bureau's interest in petroleum has not ended with the extraction and refining of crude oil. Scientists and engineers at Bartlesville have shown a continuing concern with the utilization of petroleum and its products, especially when problems arise that, if unsolved, conceivably could prevent the full and wise use of this valuable fuel resource. Air pollution from vehicular exhaust gases is, of course, such a problem, and the Bureau's Bartlesville center is hard at work on it. The research and development underway is carried out in close cooperation with such organizations as the U.S. Public Health Service and the American Petroleum Institute. This work has yielded a wealth of fundamental knowledge that is now being applied in positive engineering approaches to the reduction of exhaust gas pollutants.

The overall research and development program currently in progress at the Bartlesville center thus includes studies in production, engineering, thermodynamics, chemistry, refining, and fuels combustion. Individual projects conducted there range from fundamental research into the behavior of fluids in an underground reservoir and the mechanisms governing that behavior, to field engineering tests of new techniques in oil and gas recovery, and both theoretical and applied research in fuels combustion.

Mineral Resource Office

Bartlesville also is headquarters for the Bureau's Area IV Mineral Resource Office, which is the Federal Government's principal supplier of economic and statistical information on mineral resources and industries of Oklahoma and also of Arkansas, Kansas, Louisiana, Mississippi, Missouri, Texas, the Commonwealth of Puerto Rico, the Panama Canal Zone, and the Virgin Islands.

In carrying out its mission, the Area IV office conducts engineering studies needed to evaluate the economic potential of domestic deposits of such metals as aluminum, iron, lead, and zinc and of a variety of mineral raw materials used in construction. The office also cooperates with other Federal agencies in determining mineral and other resources that would be affected by construction of reservoirs at various sites in major river basins.

The information acquired in these and similar programs is needed by the Government and by industry in planning the future course of resource conservation and development.

Health and Safety District

A hundred miles or so due south of Bartlesville, at McAlester, Okla., is the Oklahoma headquarters of the Bureau's health and safety activity. Bureau engineers and mine inspectors working out of McAlester help provide training for mineral industry workers in first-aid, accident-prevention, and mine-rescue techniques. The Bureau also investigates fires, explosions, and accidents in mines and conducts safety inspections at mining operations. Special assistance to mine operators through Bureau safety programs includes information enabling them to make the proper selection and use of equipment, ventilation systems, and ground-support methods.

Keyes Helium Plant

In the Oklahoma Panhandle, not far from the Texas border, is one of five federally owned plants for extracting the element helium from natural gas. This Bureau facility at Keyes, Okla., is capable of processing 70 million cubic feet of natural gas each day when operating at full capacity. In 1964, the Keyes plant supplied more than 40 percent of the 784 million cubic feet of helium produced by the Bureau; helium has many important scientific and industrial applications. The primary source of the natural-gas processed for helium at this plant is the Keyes field.

Information about programs of the Bureau of Mines in Oklahoma may be obtained from the Area Director, Area IV Mineral Resource Office, Bureau of Mines, 206 Federal Building, Bartlesville, Okla. 74003.

National Park Service

The Department of the Interior's National Park Service administers two areas in Oklahoma—Platt National Park and the Arbuckle Recreation Area which is 5 miles southeast of the park.

Oklahoma and the National Park System have virtually grown up together. Only six States had national parks in 1906 when Congress established Platt. Thus, Oklahoma, still a territory, had a national park even before statehood.

Although the smallest of the Nation's 33 national parks, Platt has attracted more people than some parks a thousand times larger. From 1906 to 1966, 26,733,100 visitors sampled Platt's mineral springs and enjoyed its 912 acres of forest, field, and stream in the Arbuckle Mountain foothills. This attendance was more than twice that of Crater Lake National Park for the same period.

In recent years, the park has had more than a million visitors annually. Summer is the heaviest season, but the park remains open throughout the year. Especially interesting periods for visiting are the first 2 weeks of April, when the redbud is usually in bloom, and late autumn, when the park's heavily wooded sections display their colors.

Roads and trails lead to all points of interest in Platt. The park has three campgrounds: Rock Creek, Central, and Cold Springs. Hotels and cabins are available in the adjacent city of Sulphur.

During the summer, nature walks, campfire programs, and children's programs are conducted by the park naturalist.

Future plans for Platt National Park call for the improvement of roads and trails, the construction of a nature center, and grounds improvement.

The superintendent of Platt also is in charge of the Arbuckle Recreation Area which is administered by the National Park Service under the terms entered into with the Bureau of Reclamation in 1965.

Development of visitor facilities at the recreation area is still in an early stage. Boat ramps, parking and picnic areas, and other facilities have been provided at Buckhorn Rock, The Point, and Guy Sandy on the shore of the Lake of the Arbuckles, the area's central feature. Arbuckle Recreation Area is one of the relatively few areas in the National Park System which allows cross-country horseback riding on the range.

Future development plans include campgrounds, picnic and beach areas, boat docks and launching ramps, water and sewer systems, roads and trails, and information stations.

The Park Service has recommended the acquisition of 3,205 additional acres of private land along the reservoir slopes to preserve the lake setting and prevent developments not in harmony with the area.

Further information regarding Platt National Park and the Arbuckle Recreation Area may be obtained by writing to the Superintendent of Platt National Park, Box 539, Sulphur, Okla. 73086.

Bureau of Outdoor Recreation

The Department of the Interior's Bureau of Outdoor Recreation administers a program of grants-in-aid to States and their political subdivisions for outdoor recreation planning, land acquisition, and development. This program, which requires States to match available Federal dollars, was authorized by the Land and Water Conservation Fund Act of 1965.

Moneys in the fund derive from "pay-as-you-go" user fees and entrance charges at designated Federal recreation areas, from sale of surplus Federal real property, and from the Federal tax on motorboat fuels. The Federal recreation fee program, popularly known as "Operation Golden Eagle," promotes sale of a $7 Golden Eagle Passport—a yearlong carload entrance permit to designated U.S. recreation fee areas—and disseminates information about the Land and Water Conservation Fund. Proceeds from the sale of Golden Eagle Passports are deposited in the fund.

During the fund's first 3 years, Oklahoma received a total of more than $1.5 million in matching grants for more than 30 State and city recreation projects. Projects ranged from planning grants, land acquisition, and development of camping, swimming and other recreation facilities for State parks and recreation areas, to development of playgrounds, archery ranges, football and softball fields, swimming facilities and tennis courts, and acquisition of land for trails, in the State's populous cities.

The Bureau of Outdoor Recreation does not manage any lands or recreation facilities. Its chief duties are to cooperate with the States, promote coordination of Federal programs, administer grants-in-aid, and develop a long-range, continuing, nationwide outdoor recreation plan based on State, Federal, regional, local, and private plans.

The Bureau provides technical assistance to Oklahoma in preparation of the statewide recreation plan which the State must have to qualify for matching fund grants. This plan provides guidelines for future development by individuals, private organizations, cities, boroughs, and units of State government. The Director of the State's Industrial Development and Park Department has been designated as State liaison officer to work with the Bureau of Outdoor Recreation in the State-Federal programs.

Additional information can be obtained from Regional Director, Bureau of Outdoor

Recreation, Mid-Continent Region, Building 41, Denver Federal Center, Denver, Colo. 80225.

Bureau of Reclamation

The Department of the Interior's Bureau of Reclamation began its work in semiarid western Oklahoma as early as 1903, soon after the creation of the Bureau by Federal legislation in 1902. Several reservoir sites were selected and irrigation projects studied. However, it was not until 1949 that the first Reclamation project was completed and put into operation.

This was the W. C. Austin Project in the vicinity of Altus, Jackson County. Facilities for irrigation of 47,000 acres were constructed with water supplies from the North Fork of the Red River impounded about 16 miles north of Altus. The Bureau of Reclamation maintains and operates Altus Dam and Reservoir, however, the Lugert-Altus Irrigation District operates and maintains the irrigation works. The city of Altus has a contract with the district for a maximum of 4,800 acre-feet of water annually for its municipal and industrial requirements.

Besides providing irrigation and municipal water supplies, Lake Altus is the only sizable center for outdoor recreation and water sports in southwestern Oklahoma. Some 934,000 visitor days of use were recorded at Lake Altus in a recent year.

The Washita Basin project utilizes flows of the largest tributary of the Red River in southwestern Oklahoma. Principal features are the Fort Cobb Dam and Reservoir in Caddo County, completed in 1959, and the Foss Dam and Reservoir in Custer County, completed in 1961. The project is designed to provide municipal, domestic, and industrial water supplies for several cities and towns as well as flood control, recreation, and fish and wildlife benefits. Annual recreational use totals over 350,000 visitor-days at Fort Cobb Reservoir and about 142,000 at Foss Reservoir.

The Norman project, on Little River about 13 miles east of the city of Norman, was completed in 1965. It consists of Norman Dam, with its reservoir Lake Thunderbird, and facilities to provide supplementary municipal and industrial water for Norman, Midwest City, and Del City. The project includes flood protection and provides recreational opportunities for the populous central Oklahoma counties. About 500,000 people live within 50 miles of Lake Thunderbird, which is the largest body of water within a 100-mile radius.

The value of Lake Thunderbird for recreation was demonstrated during its first two years of use. A total of 128,000 visitor-days were recorded in 1965, and the total jumped to over 800,000 the next year. Part of the reservoir is devoted to wildlife management.

The major features of the Arbuckle project, located in Murray County, have been completed. They include a dam and reservoir on Rock Creek, a tributary of the Washita River, plus a pumping plant and about 20 miles of pipeline for delivery of municipal and industrial water to two towns and a large refinery. Some degree of flood protection is provided below the dam on Rock Creek and on the Washita River below the confluence of Rock Creek. The reservoir is located in the scenic Arbuckle Mountains and will add fishing and other recreational opportunities and wildlife benefits.

Due especially to planned expansion of Altus Air Force Base, the Mountain Park project in Kiowa County has been proposed to provide supplementary water for the cities of Snyder and Altus. The water project consists of (1) a dam and reservoir on Otter Creek, a tributary of the North Fork of the Red River, with a pumping plant and 29.7 miles of pipeline for delivery of water to the two project cities; and (2) a diversion dam on Elk Creek, also a North Fork tributary, with a 10.8-mile canal for transporting Elk Creek flows to augment Mountain Park Reservoir yields. In addition to supplying the cities' water needs, the proposed reservoir will provide flood control, fish and wildlife benefits, and recreational opportunities.

The Bureau of Reclamation is cooperating with the Oklahoma Water Resources Board and other agencies in developing a State water plan aimed at optimum use of the State's water resources. In February 1967, the Bureau published a report, "Water, the Key to Oklahoma's Future," which looks ahead 100 years to offer an assessment of water resources and requirements on a long-range, statewide basis. It makes no definite proposals but presents the framework of a plan for transporting surplus water from east to west, a plan with enough flexibility that it can be modified as conditions and requirements change. The tentative plan includes 117 reservoirs (48 of which are existing, under construction, or authorized), canals and pipelines totaling 1,968 miles, and 89 pumping plants for moving water to the dry western and Panhandle sections of the State.

Further information about Bureau of Reclamation activities in Oklahoma can be obtained from the Regional Director, Bureau of Reclamation, P.O. Box 1609, Amarillo, Tex. 79105; or the Area Engineer, Oklahoma City Development Office, Bureau of Reclamation, P.O. Box 495, Oklahoma City, Okla. 73101.

Soil Conservation Service

In Oklahoma, the Soil Conservation Service of the U.S. Department of Agriculture assists landowners and land operators in protecting and developing their soil and water resources largely through the State's 87 soil and water conservation districts. Each district, locally organized under State law, is managed by elected officials who serve without salary.

SCS, aided by State and local agencies, conducts soil surveys that are the basis for land-use decisions and conservation planning. Professional conservationists assigned to the districts help individuals plan and install conservation systems.

SCS administers the Federal part of the watershed protection and flood prevention program. Watershed projects are sponsored by local organizations for flood prevention, agricultural water management, municipal and industrial water supply, fish and wildlife development, and recreation.

SCS also administers the Great Plains conservation program—a long-range program of technical and financial assistance for areas periodically ravaged by drought and high winds—in designated counties of Oklahoma.

Additional information may be obtained from State Office, Soil Conservation Service, Agriculture Center Building, Farm and Admiral Roads, Stillwater, Okla. 74074.

Southwestern Power Administration

Southwestern Power Administration (SWPA), the Department of the Interior's power marketing agency for the Central Southwest, is the only Federal bureau with its headquarters in Oklahoma (Tulsa). SWPA has field offices in Muskogee and Ada, Okla. and in cities in Missouri and Arkansas.

SWPA was created by Act of Congress in 1943 to market hydroelectric power generated at multipurpose dams of the U.S. Army Corps of Engineers in portions of the Southwest. There are now 15 such dams from which SWPA markets power, and eight more dams are under construction. By 1974, SWPA will have a marketing capacity of over 2 million kilowatts.

Seven Federal reservoirs provide or will soon provide hydropower. They are: Broken Bow, Eufaula Reservoir, Fort Gibson Dam and Reservoir, Keystone Lake, Robert S. Kerr Lock and Dam, Tenkiller Ferry Reservoir, and Webbers Falls Lock and Dam. Total rated capacity for these seven projects will be 509,000 kilowatts. Lake Texoma, on the border of Texas and Oklahoma, is formed by Denison Dam. Installed capacity of the Denison Dam, which is in Texas, is 70,000 kilowatts.

Electrical power marketed from these dams repays a portion of the dams' cost. Forty percent of the more than $1.5 billion total cost of the 23 multipurpose reservoirs for which SWPA has power marketing authorization ultimately will be repaid to the Federal Government through the sale of power. This means a repayment of approximately $600 million.

SWPA also markets power in cooperation with REA cooperatives, municipalities, and privately owned utility companies in Oklahoma to provide every Oklahoman with dependable, economical electrical power. Oklahoma's electrical rates compare favorably with any in the United States, and the cooperation among Southwestern Power Administration, cooperatives, towns, and privately owned utility firms has been advantageous for all consumers.

Through contractural and transmission arrangements, SWPA interconnects with other transmission networks, forming a large grid that conveys electricity from Federal multipurpose projects and privately owned thermal generating plants. These sophisticated transmission systems are another reason why Oklahoma consumers enjoy economical electrical power where and when they need it. Without SWPA's transmission system, Oklahoma and other areas of the Southwest would suffer crippling blackouts.

Overall, SWPA operates approximately 1,450 miles of high-voltage transmission lines and 32 substations and switching stations, including a 161,000-volt interconnection with the Bureau of Reclamation. This intertie, the first between federally owned systems, permits interchange of up to 50,000 kilowatts between the two agencies by taking advantage of daily and seasonal diversities in demand.

Additional information about activities of the Southwestern Power Administration can be obtained from the Office of the Administrator, Southwestern Power Administration, P.O. Drawer 1619, Tulsa, Okla. 74101.

Bureau of Sport Fisheries and Wildlife

The Bureau of Sport Fisheries and Wildlife operates four national wildlife refuges in Oklahoma. Best known is the Wichita Mountains Wildlife Refuge which annually attracts more than a million and a half visitors. These people come to see the world's largest herd of longhorn cattle, 1,000 buffalo, and about 700 elk which roam the 59,000-acre area. Native populations of white-tailed deer, pronghorns, and wild turkeys are added attractions. Oklahomans also come to the Wichita Mountains Wildlife Refuge to fish and swim in its lakes and to picnic.

Tishomingo National Wildlife Refuge provides extensive picnic facilities for visitors. Hunting of waterfowl and small game is allowed on the management unit, where there are blinds to accommodate hunters. The management unit is operated by the Bureau in close cooperation with Oklahoma's Department of Wildlife Conservation. The refuge borders Lake Texoma, one of America's greatest fishing reservoirs; many anglers launch their boats here. In addition to Lake Texoma, streams passing through the refuge provide fishing opportunity. Tishomingo is heavily used by waterfowl as a resting stop during spring and fall migration. The Oklahoma Department of Wildlife calls the areas around Tishomingo and Salt Plains Refuges the best places for goose hunting in the State.

Salt Plains National Wildlife Refuge is a stopping place for migrating waterfowl and cranes. An added attraction for visitors are the unique selenite crystals. These gypsum crystals are formed under the mud of the salt flats as the water alternately floods and recedes. Collectors expose the crystals by digging, and they splash water on them to remove the mud which hides their "hourglass" configuration.

Both Wichita Mountain and Salt Plains boast populations of wild turkeys which are live-trapped and transplanted to other parts of Oklahoma in a program which has extended the range of gobblers to all parts of the State. The trapping and transplanting is done cooperatively by the Bureau and the State Department of Wildlife.

Deer hunting is allowed on Salt Plains during open seasons, in accordance with State regulations.

Newest of the Oklahoma refuges is the Washita, an important migration stop for ducks, geese, and sandhill cranes. Upland game hunting is allowed on the refuge, and its quail hunting is top quality.

Other Responsibilities

The Bureau of Sport Fisheries and Wildlife operates the Tishomingo National Fish Hatchery, a large-scale producer of warm-water species—black bass, catfish, and sunfish—for stocking in farm ponds and other waters in Oklahoma. The Tishomingo Hatchery has produced large numbers of black bass fingerlings which were sent to distant waters, including a third of a million which went to Lake Powell on the Arizona-Utah border. Stocking of hatchery-produced fish is carried out in accordance with a management plan developed in cooperation with the Oklahoma Department of Wildlife Conservation.

The Bureau's Division of River Basin Studies has made many investigations of fish and wildlife resources affected by the extensive water development projects undertaken or planned by the U.S. Army Corps of Engineers. Recommendations made jointly by the Division of River Basin Studies and the Oklahoma wildlife agency as a result of these studies have been adopted for enhancement of fish and wildlife.

Two Federal game management agents are stationed in Oklahoma to enforce Federal regulations concerning migratory birds and to carry out management duties of the Bureau, in particular the censusing of waterfowl populations, again in cooperation with the State.

Additional information about the Bureau of Sport Fisheries and Wildlife can be obtained from the regional office at 517 Gold Avenue SW., Albuquerque, N. Mex. 87100 or from the Bureau headquarters in Interior Building, Washington, D.C. 20240.

Office of Water Resources Research

The Water Resources Research Act of 1964 (Public Law 88–379 as amended by Public Law 89–404, April 1966) is administered by the Office of Water Resources Research (OWRR). It is one of the newest of the Federal-State programs dealing with natural resources. Focal point in this program is establishment of an approved water resources research center or institute in each State and Puerto Rico.

The Oklahoma Water Resources Research Institute at Oklahoma State University, Stillwater, is one of these 51 centers that receives annual allotments from OWRR to promote research and training in the water resources field. Funds for matching grants for the support of specific research projects submitted by these centers are available on a competitive basis. The act also authorizes appropriation of Federal funds through matching grants or other arrangements, to public agencies, other institutions, private industry, or individuals for research on selected water problems related to the mission of the Department of the Interior.

The Oklahoma Institute is doing considerable research on the role of algae in the eutrophication of large reservoirs and on the biological, chemical, and thermal characteristics of various impoundments within the State. Other research deals with: the development of filters and other means of making water from surface impoundments safe for domestic use; improved designs for irrigation ditches to reduce water losses during distribution; water yield; and economic efficiency in the allocation of irrigation water over an extended period of time.

The institute maintains close contacts with colleges and universities within the State having competence in water resources research and training, and keeps advised on local and State water resources research needs.

The University of Oklahoma Research Institute at Norman, Okla., was the recipient of one of the first Title II projects approved under Public Law 88–379. This project involves the development of models for water requirement forecasting.

Students who are employed as research assistants to the well-qualified principal investigators conducting approved projects receive valuable training while performing useful research; the two primary products of this program—research results and trained personnel—should be of increasing importance to effective water resources management in Oklahoma.

Additional information on the activities of the Office of Water Resources Research pertaining to Oklahoma may be obtained from the Director, Water Resources Research Institute, Oklahoma State University, Stillwater, Okla. 74075.

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Past and Future

It was only through great pressure applied by the United States Government that the Five Civilized Tribes were persuaded to leave their homes in the southeastern section of the country and to travel many miles west to a strange, new land. Later in the 19th century, other people realized the desirability of Indian Territory.

Texas cattlemen moved their herds over the lush land to railheads in Kansas, and Boomers promoted the opening of the territory to non-Indians. Finally, in 1889, the first "run" took place. Tent cities sprang up and full-fledged towns with newspapers, doctors, and lawyers were soon seen.

Just before Oklahoma entered the Union in 1907, the first great oilfields were discovered. Obviously, this was a land of bounty.

But even here—in a land of bounty—conservation is necessary. The fertile land, unless properly cultivated, will turn to dust bowls. Though oil is plentiful, planning is essential for proper recovery. And planning also is necessary if the abundant supply of water in the eastern section of the State is to be made available to the dry western section.

It is with these thoughts in mind that the Federal natural resource agencies, in cooperation with local and State agencies, undertake their task to assure the wise utilization of Oklahoma's many natural resources.

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As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources." The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States— now and in the future.